HANDBOOK

FOR THE

12-PR. B.L. 6 CWT. GUN

(MARKS I-IV).

AND

CARRIAGES, MARKS I* AND II.

(HORSE ARTILLERY.)

1903.

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DIAGRAMS OF PACKING.

PLATES.

N.B.—This Handbook is corrected up to March, 1903. Any alterations which may be suggested should be forwarded direct to Chief Inspector, Royal Arsenal, Woolwich.

ORDNANCE, B.L., 12-PR., 6 CWT. (MARKS I–IV).

(PLATES I AND II.)

DESCRIPTION.

Material				Steel (wire construction.)
Weight	Mark I gun	with fittings		6 cwts. 1 qrs. 18 lbs.
		breech fittings		— 1 „ 1 „
	„ II „	with fittings		6 cwts. 1 „ 26 „
	„ III „	„ „		6 „ 0 „ 0 „
	„ IV „	„ „		5 „ 3 „ 12 „
	Marks II–IV guns, breech fittings			— 1 „ 17 „
Length	Mark I gun			66·75 inches.
	„ II „			64·35 „
	Marks III and IV guns			71·05 „
Bore	calibre			3 inches.
	length	Mark I gun		59 „
		„ II „		59·3 „
		Marks III and IV guns		66 „
Chamber	diameter	Mark I gun		3·2 „
		Marks II–IV guns	largest	3·35 „
			smallest	3·2 „
	length	Mark I gun		9·05 „
		Marks II and III guns		9·8 „
		Mark IV gun		7·8 „
Rifling	system	Marks I, II and IV guns		Polygroove, hook section.
		Mark III gun		„ modified plain section.
	length	Mark I gun		49·25 inches.
		„ II „		43·3 „
		„ III „		55 „
		„ IV „		56·8 „
	twist	Marks I and II guns		Increasing from 1 turn in 105 calibres at breech end of rifling to 1 in 28 at 15 inches from the muzzle, *remainder uniform* 1 turn in 28 calibres.
		Mark III gun		Increasing from 1 turn in 100 calibres at breech to 1 turn in 35 calibres at muzzle.
		Mark IV gun		Increasing from 1 turn in 120 calibres at breech to 1 turn in 28 calibres at muzzle.
	grooves	number		18.
		depth		·04 of an inch.
		width	Marks I, II and IV guns	·4 „ „
			Mark III gun	·265 „ „

NOTE.—In future conversion of Mark I guns to Mark II, the A tube will be made the same length and having the same chamber and rifling as the Mark IV gun. Marks II and III guns when retubed on repair will also have the same chamber and rifling as Mark IV guns.

Mark I Gun.

The gun is made of steel, and consists of the A tube, around which are wound successive layers of steel wire, extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube, and secured longitudinally by a shoulder on the A tube, and a steel breech bush screwed into the jacket at the rear. The breech bush is prepared for the reception of the breech screw, and furnished with lugs for the attachment of the breech fittings and elevating mechanism: the rear portion of the bush also forms a hood for the protection of the fittings. The B hoop is shrunk round the A tube immediately in front of the jacket, by which it is partially overlapped.

The chamber is cylindrical, slightly coned at the entrance, and terminating in front with a curved slope.

On a certain number* of guns, a plane for clinometer is prepared on the exterior of the jacket at the breech, but no more will be so prepared.

Mark II Gun.

The gun is of steel and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube. A steel bush is screwed into the rear end of the A tube forming a seating for the obturator. The jacket and A tube are secured longitudinally by a shoulder on the A tube and a steel breech bush screwed into the jacket at the rear; the breech bush is prepared for the reception of the breech screw. Over the rear end of the jacket is shrunk the breech ring, which is provided with lugs for the attachment of the breech fittings and elevating gear. The B hoop is shrunk round the A tube immediately in the front of the jacket.

Mark III Gun.

The gun is of steel and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and the A tube, and secured longitudinally by shoulders on the A tube and a steel breech bush screwed into the jacket at the rear. The breech bush is prepared for the reception of the breech screw.

Mark IV Gun.

The gun is of steel, and consists of the A tube around which are wound successive layers of steel wire extending over the chamber and a portion of the bore. The jacket with trunnions is fitted over the exterior of the wire and a portion of the A tube, and secured longitudinally by shoulders on the A tube and a steel breech bush screwed into the jacket at the rear; the breech bush is prepared for the reception of the breech screw. Over the rear end of the jacket is

* Nos. 4, 5, 6, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25 and 28 only have the clinometer plane.

shrunk the breech ring, which is provided with lugs for the attachment of the breech fittings and elevating gear. The B hoop, which carries the fore sight, is shrunk round the A tube immediately in front of the jacket.

Marks II–IV Guns.

The entire portion of the chamber is cylindrical, reduced in diameter with a curved slope in front and coned at the rear.

A plane for clinometer is prepared on the upper surface of the jacket.

Axis lines are formed on the vertical and horizontal axes of the gun at the muzzle.

Breech-closing mechanism.

Mark I Gun.

(Plate III)

The breech is closed by a parallel screw having three portions of the screw thread removed longitudinally, each one-sixth of the circumference. The interior of the gun at the breech being prepared in a similar manner, admits of the screw, when the raised portions are placed opposite the smooth surfaces in the gun, being pushed home, and locked by the sixth of a turn.

The breech screw has hinged to it a cam lever, by means of which it is locked and unlocked; the cam portion of the lever (when the breech-screw is locked) falls into a recess in the carrier ring, and so prevents any movement of the breech screw during firing. In lowering the cam lever, after the breech screw is unlocked, the cam acting upon the surface of the carrier ring, starts the first movement to the rear of the breech screw and obturator.

Encircling the rear end of the breech screw, and hinged to the hood, is a carrier ring, which supports the screw when withdrawn.

The carrier ring is held to the gun during the withdrawal of the breech screw, by means of a clip fitted to the left side of the ring, engaging with a recess in the hood.

A stop bolt in the right side of the carrier ring serves to prevent the breech screw being disengaged from the carrier ring when withdrawn; at the same time, the clip in the left side of the carrier ring is disengaged from the recess in the hood by means of a spiral spring, which forces the opposite end of the clip into a recess in the breech screw, thus securing the latter in the carrier ring. When in this position, the whole can be swung clear of the breech opening to admit of loading.

If, when opening the breech, the carrier ring remains fast, owing to the "clip retaining" not working properly, the latter can be pushed back by inserting the punch end of the breech mechanism wrench, in the hole provided for this purpose, on the left side of the breech.

Marks II–IV Guns.

(Plate IV.)

The breech is closed by a parallel screw ("Welin" system), which differs from the interrupted screw used with B.L. guns generally, in having a larger amount of thread in proportion to its length, by arranging segments at varying diameters, the breech opening of the

gun being prepared in a corresponding manner. The interruptions in the gun are arranged to accommodate the segments of the screw of largest diameter, thus, when the screw is unlocked these segments pass into the interruptions, and the segments next smaller in diameter unlock into the spaces left vacant by the larger ones.

A carrier for supporting the breech screw is hinged by a bolt to the right side of the gun at the breech, the breech screw being attached to the carrier by means of corresponding interrupted screw threads, and by a steel vent passing through the centre of the breech screw. The vent has a mushroom head at the inner end behind which the obturator is placed. The vent is retained in position by means of a sleeve, spiral spring, and nut, in the carrier. The carrier is furnished with a breech mechanism lever, pinion, and link, by means of which the breech screw is worked.

A catch fitted to the carrier engages with a corresponding recess in the rear face of the breech screw, when the breech is open, and retains the screw in the unlocked position. The catch is automatically disengaged from the screw in closing the breech.

A catch fitted to the breech mechanism lever engages with a corresponding recess in the left lug for elevating bolt, and retains the lever in the closed position.

Obturator.

Mark I–IV Guns.

The system of obturation consists of a circular pad, with protecting discs fitting the mouth of the chamber, being placed between the mushroom head of the axial "T" vent and the inner face of the breech screw.

The pad being slightly elastic, expands radially when compressed by the action of the gas generated by the fired charge, thus completing obturation.

To prevent play, owing to slightly varying dimensions of the pads, and their becoming compressed by firing, thin adjusting discs of steel are placed between the rear protecting disc and the face of the breech screw.

Firing Mechanism.

Mark I Gun.

The firing mechanism is designed for friction firing, with "T" friction tubes.

It consists of a steel axial "T" vent, passing through the centre of the breech screw, having secured to its outer end a head for the reception of the "T" friction tube. The axial "T" vent is retained in position by means of a spring catch in the breech screw. Fitted to the outer face of the breech screw and encircling the head of the axial "T" vent is an actuating collar, worked by the cam lever, by means of which the "T" tube is automatically turned into the firing position, and the vent sealed, when the cam lever is lowered. The "T" tube is automatically released from the vent, and turned into the position for withdrawing, when the cam lever is raised, the tube being withdrawn by hand.

A "T" vent rimer is provided for clearing the taper portion of the vent channel in the "T" vent, in the event of it getting choked, so as to admit of the insertion of the tube.

Mark II–IV Guns.

The firing mechanism is designed for friction firing with "T" friction tubes, and is so arranged that the gun cannot be fired before the breech is closed, and the breech mechanism lever home.

A steel box in which the "block retaining tube" slides is secured to the outer end of the vent, the retaining block being pushed into a position over the vent by means of a cam groove on the link when the breech is closed. A safety shutter on the left side of the slide box serves to prevent the lanyard being hooked on to the "T" friction tube in the vent before the breech mechanism lever is home. An extractor for releasing the "T" friction tube from the vent is fitted to the slide box, and is actuated automatically by means of the retaining block in opening the breech.

The lanyard for firing the gun is pulled from the left side.

A "T" vent rimer is provided for clearing the taper portion of the vent channel in the "T" vent, in the event of it getting choked, so as to admit of the insertion of the tube.

Sighting.

Mark I Gun.

(*Plate V.*)

The gun is side sighted and provided with two rows of sights.

The tangent sights are of steel; the cross heads are furnished with screw deflection leaves, giving deflection to 1½ degrees right and left, and having notches at the top and small eye holes underneath. The bars are triangular in section and are graduated on the rear face to 4,800 yards for a muzzle velocity of 1,553 ft. secs., and on the right face to 13 degrees. The sights fit into bronze sockets held by fixing screws, and are provided with movable clamps. The bronze sockets are set at an angle of 1 degree 30 minutes for correction for drift.

Spring bolts, passing through the sockets, enter recesses in the sight bars when at zero, and prevent their being shaken out when the gun is passing over rough ground. The bolt on the right side is moved by pushing in, and that on the left, by pulling out, so as to make the sights interchangeable.

The fore sights are of bronze, with circular apertures containing an aluminium blade projecting from the left side to the centre, surmounted by a steel acorn point. The sights are interchangeable, and slide into grooves in front of the trunnions, being retained by spring studs, which are released by raising the catches.

The tangent sight is correctly set—

For elevation.—When no space can be seen between the line marking the graduation ordered and the top of the clamp, while the line is not covered by the clamp.

For deflection.—When the line marking the graduation ordered is exactly in continuation of the arrow head.

Marks II–IV Guns.

(*Plates VI–VIII.*)

The guns are side sighted with tangent and fore sights on the left side only.

The tangent sight is of steel; the cross head is provided with a notched deflection leaf and traversing screw, giving 1½ degrees deflection right and left. The bar is rectangular in section graduated on the rear face to 11 degrees, reading to 10 minutes. The sight is

furnished with a bronze socket having a railled head, and a drum, engraved with a yard scale to 4,500 yards, and a pinion which gears with a corresponding rack on the front face of the sight bar. An indicating arrow engraved on the socket serves to facilitate reading the yard scale.

The sight is retained in position in the gun by means of a spring catch which engages with a recess formed in the socket for its reception.

The fore sight used with the Marks II and III guns is the same as that previously described for Mark I guns.

The fore sight used with the Mark IV gun consists of a steel stem surmounted by a steel acorn point. The sight slides into a groove prepared for its reception in a projection on the side of the jacket, and is secured in position by means of a spring catch.

The tangent sight is correctly set—

For elevation.—When the line on the drum, marking the graduation ordered, is exactly in continuation of the indicating arrow on the socket.

For deflection.—When the line on the cross head, marking the graduation ordered, is exactly in continuation of the indicating arrow on the deflection leaf.

Instructions for the Care of Tangent Sights (Grenfell).

The sight bar of the tangent sight, and the graduated drum must not on any account be removed from the socket, as if this is done they are very liable to be assembled incorrectly in relation to each other.

The sights are interchangeable only as a whole, and a sight bar must remain with the socket in which it is issued.

The stop screw at the bottom of the bar is secured by means of a copper rivet. It must not be unscrewed on any account.

Telescopic Sight.

Mark I Gun.

The gun is fitted with a steel bracket for carrying the telescopic sight. The bracket is firmly attached to the face of the right trunnion by a dovetail and two fixing screws. A bronze adjusting screw is provided in the upper part of the bracket, to alter the position of the telescope, so as to correct for difference of level of the wheels. A leather cover for the bracket is provided, shaped to suit the bracket, and secured in position by a ⅜-in. strap.

Description and instructions for using, &c., are published in a separate handbook.

Marks II and IV Guns.

The guns are fitted with a steel bracket for carrying the telescopic sight, Mark II guns on the right trunnion, Mark IV guns on the left trunnion. The bracket is firmly attached by a dovetail and two fixing screws. A bronze adjusting screw is provided in the upper part of the bracket to alter the position of the telescope so as to correct for difference of level of the wheels. A leather cover for the bracket is provided, shaped to suit the bracket, and secured in position by a ⅜-in. strap.

Mark III guns are not at present fitted for telescopic sights.

Description and instructions for using, &c., are published in a separate handbook.

De Bange Obturator.

Marks I–IV Guns.

The *Mark I* obturator consists of an asbestos pad and pair of metal discs. The inner face of the breech screw is flat, and between it and the mushroom head of the axial "T" vent the pad and discs are arranged. The pad is made of asbestos, worked up with mutton suet to a proper consistency, and enclosed in a strong double canvas cover; it is reduced to shape and pressed in a hydraulic machine. The word "front" will be marked on the front of the pad, and the word "rear" on the rear part. The pad is enclosed between two tin discs, the outer angles of which are protected by steel rings. The words "front" and "rear" will be marked on the inner faces of the front and rear discs respectively. The gun is coned at the seat of the obturator when pushed home, and the obturator is provided with a corresponding taper to insure a good fit.

In putting the obturator on the vent, first place the front protecting disc with its rounded side fitting the back of the mushroom head, then the pad with that side to the front which is curved to fit the front disc, the stitched side being to the rear, then the rear protecting disc, and in placing this, its flat side and bronze ring with which it is bushed should be on the opposite side to the pad.

If correctly assembled, the whole should fit together compactly. Should there be any play between the obturator and the face of the breech screw, one or more adjusting discs are placed behind the protecting disc.

The *Mark II* obturator, for Marks II to IV guns, differs from Mark I in the pad being heavier and slightly different in shape. A protecting disc of copper is shaped to fit the front of the pad, and is provided round the outer edge with a split steel ring, which is arranged to suit the coned seating for obturator in the gun. The rear of the pad is protected by inner and outer steel rings, the latter being split and arranged to suit the seating in the gun.

The Marks I and II obturators are interchangeable, for Marks II to IV guns, as a whole, but not in part.

The pads issued on breech screw with a gun have always been previously expanded in that gun, but the first time any other pad is used it should be with a full charge and projectile.

Action.

Marks I–IV Guns.

When the breech screw is pushed into the gun, the obturator enters the chamber with perfect ease; on turning the breech screw, the pad is pressed home into the coned seat in the gun by the travel of the screw. The bore is thus perfectly closed by a species of buffer in contact all round the circumference, while the mushroom head of the "T" vent receives the force of the gas on discharge. On firing the gun, the pressure acts on the mushroom head which compresses the pad against the breech screw, causing it to expand laterally; from symmetry of form and position, this expansion must be radial to the axis and equal in every direction, and is sufficient to prevent the escape of the gas. On the pressure being removed, elasticity comes into play, and the obturator can be withdrawn from the cone by a straight pull, which can be given as soon as the screw is unlocked.

The pads are almost indestructible, except perhaps from the wear of opening and closing the breech, but if the firing is rapid they may get softened by heat; in this case, the obturator should be changed, the pad being thrown into cold water for a time, when it will soon be restored to good condition again. Spare obturators are provided, and also steel adjusting discs, which should be inserted between the rear protecting disc and the face of the breech screw if the pad becomes compressed by firing, but in all cases the obturator should turn freely on the breech screw.

The outer canvas of the obturating pad should be free from rents; small bruises, likely to be removed by the pressure of firing, are of no importance.

If the pad is not in good order, or there are too many adjusting discs behind the pad, stiffness in working the breech will probably result.

The obturating pad should be rubbed occasionally with Russian tallow, mixed with oil or some other suitable lubricant, and the pad with protecting discs should be carefully handled to prevent them being indented or bruised.

The obturator should be kept complete on the axial "T" vent in the gun, or in the bronze box provided for the purpose, as there is a tendency of the pad to swell in the direction of its axis, which might cause difficulty in adjusting it on the "T" vent.

To Remove the Breech Fittings.

MARK I GUN.

Before removing the fittings, the breech should be opened, the breech screw being swung into the loading position.

Obturator.

Press down the lever of the spring catch in the breech screw, the axial "T" vent can then be withdrawn from the front of the breech screw, and the obturating pad and discs removed from the vent.

When the obturator is attached to the breech screw, the removal of the latter from the carrier ring should be done by two persons, as care is necessary to keep the "clip, retaining, carrier ring" withdrawn clear of the breech screw before drawing the latter back, to avoid damaging the obturating pad and discs. The obturator should, however, always be detached, when possible, from the breech screw before removing the latter from the carrier ring.

Breech Screw.

When the breech is open, the breech screw is held in the carrier ring by a stop bolt on the right, and by the retaining clip of the carrier ring on the left. By withdrawing the retaining clip from the breech screw and holding it back (by means of a screwdriver used as a lever), the breech screw can be moved forward and the stop bolt pushed out from behind; the breech screw can then be withdrawn from the carrier ring, the retaining clip being held back until the breech screw is clear of the ring

Carrier Ring.

This is attached to the breech by a hinge bolt secured by a keep-pin. When the latter is taken out, the hinge bolt can be removed by giving it a few taps underneath with a piece of wood.

Clip, Retaining, Carrier Ring.

This retaining clip is actuated by a spiral spring, and retained in the carrier ring by means of a set screw. On the removal of the set screw, the clip and spiral spring can be withdrawn from the ring.

Collar, Actuating, "T" Friction Tube.

To remove the actuating collar from the breech screw, the cam lever must be lowered; the lever of the spring catch must then be pressed down, and the actuating collar turned to the left; the collar can then be removed to the rear.

Spring, Catch, Breech Screw.

To remove the spring catch, it must be pressed outwards, by means of a piece of wood (used as a lever in the interior of the breech screw), until the axis pin of the lever is clear of the exterior of the breech screw. The axis pin can then be removed, by means of a screwdriver, and the lever and catch, with spiral spring, withdrawn from the breech screw.

Cam Lever.

The cam lever must be lowered and withdrawn to the left.

To Re-Assemble the Breech Fittings.

The converse of the above action takes place in re-assembling the fittings on the gun.

Care must be taken, when placing the axial "T" vent and obturating pad and discs in the breech screw, to see that the indicating arrows engraved on the mushroom head of the axial "T" vent and the front end of the breech screw correspond, as it is in that position only that the spring catch in the breech screw, for retaining the obturator, will engage with the recess for its reception in the axial "T" vent.

MARKS II IV GUNS.

Before removing the fittings the breech should be opened, the breech screw being swung into the loading position.

Block, Retaining Tube.

Withdraw the guide bolt clear of the cam groove in the link, and remove the block by pressing it downwards.

Box, Slide.

Turn the slide box through a quarter of a circle (care being previously taken to see that the extractor is clear of the vent), and withdraw to the rear.

Vent, T, Axial and Obturator.

Unscrew the nut of the vent by means of the "B" wrench, and remove the nut and spiral spring from the rear, and the vent with obturator from the front end of the breech screw. The sleeve can then be withdrawn from the interior of the carrier to the rear.

Lever Breech Mechanism, and Pinion Link.

Remove the keep pin and nut from the breech mechanism lever stud, press in the catch retaining breech screw clear of the recess in the screw and turn the breech screw to the right until the link is clear of the breech mechanism lever, when the latter with the link pinion can be withdrawn.

Link, and Breech Screw.

Unscrew and remove the check screw and axis pin of the link from the carrier, then press in the catch retaining breech screw clear of the recess in the screw, and turn the breech screw to the right (care being taken to hold the link so as to prevent it fouling the carrier), until the corresponding interrupted screw threads of the breech screw and carrier are disengaged, when the breech screw and link can be withdrawn.

Catch Retaining Breech Screw.

On the removal of the breech screw, the catch with spring can be withdrawn from the carrier.

Carrier.

Remove the keep pin and collar from the hinge bolt, and withdraw the hinge bolt, when the carrier with bearing washer can be removed.

To Re-Assemble the Breech Fittings.

The converse of the above action takes place in re-assembling the fittings on the gun.

Link, and Breech Screw.

In assembling the breech screw and link on the carrier, care must be taken to allow a space of about ·1 of an inch between the faces of the breech screw and carrier in order to admit of the corresponding interrupted screw threads on the carrier and breech screw engaging when the latter is turned.

Lever Breech Mechanism, and Pinion Link.

In assembling the breech mechanism lever and link pinion, the breech screw should be turned into the locked position on the carrier and the lever with link pinion placed on the stud, the lever being held at an angle of about 45 degrees with the rear face of the carrier. Great care must be taken in replacing these fittings, as if the pinion is not engaged correctly with the link, the breech mechanism will not work.

Vent ┳ Axial, and Obturator.

First place the sleeve in the recess in the carrier for its reception, then insert the vent with obturator from the front (care being taken that the pad and discs are correctly assembled and placed on the vent, and that the feather on the latter is placed opposite the featherway in the sleeve), and replace the spring and nut at the rear.

Box, Slide.

Push the extractor into the loading position in the box slide before inserting the latter in the carrier.

Block, Retaining Tube.

The safety shutter on the box slide must be pushed forward as far as it will go before inserting the block.

NOTE.—When turning the breech screw the operator is supposed to be standing at the breech of the gun looking towards the muzzle.

CARE AND PRESERVATION OF 12-PR. 6 CWT. B.L. GUNS AND FITTINGS.

See "Regulations for Care and Preservation of War Matériel, and for Magazines."

SPECIAL INSTRUCTIONS NOT IN THE ABOVE MENTIONED REGULATIONS.

The breech fittings should be kept clean and oiled or greased, and in good working order; all working surfaces must be well lubricated, the fittings being taken off sometimes for this purpose, especially after firing.

To lubricate the hinge bolt of the carrier or carrier ring without removing the fittings, the small screw on the top of the bolt should be removed and oil poured into the channel, taking care to replace the screw after oiling.

All fittings of the gun should be treated with care; violence and jerks should be avoided, and no unnecessary force should be employed.

The breech fittings should work easily, and be free from cracks and burrs. The latter can be removed by filing, but this must be done carefully so as not to permanently damage the fitting. Should a crack be observed in a breech fitting, it should be exchanged if possible.

The threads of the breech screw should be free from burrs; should the screw not work easily when the obturator has been detached, the defect may often be remedied by careful filing, but no portion of the thread should be cut away to remove a crack, &c.

The breech should be kept covered up, if possible, to prevent dust and grit getting into the interstices of the breech fittings, which might impede their easy working. A canvas cover is provided for this purpose.

The following is a list of the oil holes in the breech fittings of Marks II–IV Guns, which require to have the screws occasionally removed and oil poured into the channels, so as to lubricate the parts.

without removal of the fittings. Care must be taken to replace the screws immediately after oiling:—

Fitting to be Lubricated.	Position of Oil Holes.
Carrier, hinge-bolt	Top of hinge bolt
Breech mechanism lever, stud ..	Top of stud
Link, axis pin	Upper side of carrier
Breech screw	Plain portion of breech screw

In addition to the above, the stud for link on outer face of breech screw should be lubricated through the oil channel in the link.

Transport.

In preparing the guns for transport, the sights only will be removed, the guns with their components being packed in boxes, the sights being also packed in the same boxes separately.

CARRIAGES, LIMBERS, AND WAGONS.

Carriages, Field, B.L., 12-pr., 6 cwt., Marks I*, II.
Limbers, Field, B.L., 12-pr., 6 cwt., Marks I, II.
Wagons, Ammunition, B.L., 12-pr., 6 cwt., Marks I, II.
Wagons, Forge, R.A., Marks I*, II, II*.
Limbers, Wagon, Forge, R.A., Marks I**, II*.
Wagons, Store, R.A., Marks I, II.
Limbers, Wagons, Store, R.A., Marks I*, II*.
Wagons, Ammunition and Store, R.A., Marks II*, III and IV.

Carriage, Field, B.L., 12-pr., 6 cwt., Mark I*.

(*Plate IX.*)

The carriage consists, generally, of two side brackets and elevating gear, mounted on an axletree having 2nd class arms, and field wheels.

The side brackets are connected by transoms and the plate portions of the trail eye, and are made of steel plate, riveted to angle steel frames, which are formed at the upper ends into bearings for the gun trunnions. Two compartments are formed between the brackets, each being fitted with a wood block, the upper one to contain a McMahon spanner, a pair of pincers, a claw hammer and a breech screw brush, and the lower a No. 9 oil can.

The trail eye (No. 20) is of steel, the eye being fitted with a steel piece forged in.

The elevating gear (which is actuated by a hand wheel on the left† side of the carriage) consists of an inner and outer screw, right and left handed, bevel pinions and hand wheel; the whole being supported by an oscillating bracket, which is supported in bearings fixed to the side brackets of the carriage.

The recoil spade consists of a spade-shaped toothed blade, suspended under the axle by a telescopic spring case, which is hinged

† Two batteries with Mark I* carriages have the handwheel on the right side, and the handles for actuating the brake gear on the left side.

to a bracket fitted to the underside of the carriage below the axletree. The blade is also attached by a wire rope to another spring case fitted obliquely between the side brackets near the trail eye.

When not in use, the spade is raised under the trail and secured by a clip, the handle of which is at the right side of the trail, and can be locked by a keep pin.

When in action the blade is released and touches the ground slightly in rear of the axle. When the gun is fired and the carriage recoils the teeth of the spade catch in the ground, the carriage moving over the spade, the wire rope attachment drawing out the spring in the trail, and the shaft of the spade compressing the upright spring; after recoil the springs return the gun to the firing position.

The tire brake, which can be used as a recoil brake, or when travelling, or for controlling the return of the gun into the firing position after recoil (if required), consists of a tubular cross shaft, passing through openings in the side brackets, and suspended by tension links from the top of the trail. The shaft is fitted at each end with arms for the reception of cast iron brake blocks, which act on the wheels; it is applied either from the front or rear of the carriage by means of handles which are fixed one on each end of a spindle, supported, in brackets, on the right side† of the carriage. The brake blocks can be reversed when required for travelling on heavy clay ground, in order to give a greater clearance between the brake and the wheels. When used for checking the recoil of the gun the brake blocks are brought into contact with the wheels, and the brake arms released by means of a handle which sets free the retaining catch on the side of the carriage.

Axletree boxes are fitted on each side of the carriage, and are supported over the axletree by brackets. Each box is arranged to hold two rounds of ammunition, case shot on right side and shrapnel on the left. The lids of the boxes are made of tempered steel, and, when fully raised, act as protecting shields for the numbers serving the gun.

The axletree, which is 2nd class, "C" (No. 89), is a tubular steel forging; it is passed through a hole in the front of each bracket, and secured in position by flanges, which pass over octagons cut on the axletree. The axletree is also connected to the side brackets by a stay of steel plate fitted to the underside of the carriage below the axletree.

The wheels are 2nd class, "C," No. 35A, 5 feet in diameter, with steel nave, removable pipe box, and a 3-inch steel tire with rounded edges. The nave consists of two flanges of corrugated steel, which are connected by 14 bolts; the inner flange is fitted with a steel ring to strengthen it, and the outer flange with a metal centering ring; the pipe box is passed through the flanges, and is secured by a nut, which is prevented from working loose by a spring fixed to the centering ring. A spanner, No. 93, is provided for removing the pipe box; it is carried on the "near" side of the ammunition box of the wagon.

A traversing handspike (No. 2, Mark II) fits into a socket which is hinged to the lower part of the trail. In action, the socket is held in position by a pawl; when travelling, it is turned over, and the handspike is strapped to the top of the trail; this handspike is also used as a rammer.

† Two batteries with Mark I* carriages have the handwheel on the right side, and the handles for actuating the brake gear on the left side.

The carriage is furnished with advance rings, hooks for sponge buckets, locking plates, and fittings for carrying two aiming posts and various small stores, as shown in packing diagram A.)

Carriage, Field, B.L., 12-pr., 6 cwt., Mark II.

(*Plate X.*)

The carriage consists generally of two side brackets, elevating gear, spade attachment, tire brake, and the two axletree boxes mounted on an axletree having 2nd class arms and field wheels.

The side brackets are connected by transoms, top and bottom plates, and the plate portion of the trail eye, and are made of steel plate, riveted to steel angle frames, which are formed at the upper ends into bearings for the gun trunnions, the gun being secured by means of capsquares and keys fitted to the bearings.

The trail eye (No. 28) is of steel.

The elevating gear (which is actuated by a handwheel on the left side of the carriage) consists of an inner and outer screw, right and left handed, bevel pinions, and handwheel, the whole being supported by an oscillating bracket, which is supported in bearings fixed to the side brackets of the carriage.

The recoil attachment consists of a spade-shaped toothed blade, suspended under the axle by a telescopic spring case, which is hinged to a bracket fitted to the underside of the carriage below the axletree. The blade is also attached by a wire rope to another spring case fixed obliquely between the side brackets near the trail eye.

When not in use the spade is raised under the trail and secured by a pawl, the releasing lever of which is at the right side of the trail, and can be locked by a keep pin.

When in action the spade is released, and touches the ground slightly in rear of the axle. When the gun is fired and the carriage recoils, the teeth of the spade catch in the ground, the carriage moving over the spade, the wire rope attachment drawing out the spring in the trail, and the shaft of the spade compressing the upright spring; after recoil the springs return the gun to the firing position.

The tire brake can be used as a recoil brake, or for controlling the return of the gun into the firing position after recoil (if required), also when travelling. It consists of two brake arms, each pivoted to the side brackets of the carriage, and supported by stays from the top of the trail—two brake rods and a rocking lever. Each brake arm is fitted at its outer end with a cast iron brake block, which acts on the wheel. The arms are actuated either from the front of the carriage by means of a handle attached to the right brake rod, or from the right rear of the carriage by means of a crank formed on the same rod.

Axletree boxes are fitted on each side of the carriage, and are supported over the axletree by brackets. Each box is arranged to hold two rounds of ammunition, case shot on right side, shrapnel on left.

The axletree (2nd class "C," No. 89), is a tubular steel forging; it is passed through a hole in the front of each bracket, and secured in position by flanges, which pass over octagons cut on the axletree.

The wheels are 2nd class "C," No. 35A. (*See* p. 15.)

A traversing handspike (No. 2, Mark III) is hinged to the lower part of the trail. In action the handspike is held in position by a

pawl; when travelling it is turned over and secured to the right side of the trail by a spring clip.

A wooden rammer is carried on the top of the trail on the left side, and secured in position by a spring clip.

The carriage is furnished with locking plates, bands, with bucket hooks and advance rings, and is fitted for carrying a "can, lubricating, No. 9" in leather case, two aiming posts, and various small stores, as shown in packing diagram B.

†Limber, Field, B.L., 12-pr., 6 cwt., Mark I.

(*Plate XI.*)

The limber consists of a frame and an ammunition box, mounted on a 2nd class axletree and field wheels, a pole and supporting bar, and two steel swingletrees.

The frame consists of four futchels; the two inner are of steel plate flanged top and bottom, with holes bored in the deepest part to suit the axletree; the two outer futchels are of angle steel, and are bolted to brackets which connect them to the axletree. Diagonal stays, of angle steel, are attached to the outer futchels, over the axletree, and to the inner futchels at their forward ends, where the staple for the pole is riveted between them. A platform and a footboard are bolted to the top, and draught hooks (for the swingletrees), to the front of the outer futchels. At the rear, brackets are fitted on each side of the limber hook for a wood shelf to facilitate the setting of fuzes.

The ammunition box is of wood; it is fitted with two lids, a striking plate (to take the blow of the trail when limbering up), and cranked guard irons with leather guards. The box is fixed internally with partitions, and arranged to carry a supply of Shrapnel shell, case shot, cartridges, fuzes, and friction tubes.‡ The projectiles are carried upright, the bottoms fitting in aluminium trays,§ fixed to the bottom of the box; the projectiles are steadied at the top by wooden blocks, which fit between their heads, and are held in notches in the top of the partitions, and the ends of the box, by wood battens attached to the lids. Two cartouches (each holding 22 cartridges) and four fuze boxes (two No. 20, one No. 21, and one No. 28), are carried in suitable compartments. A leather holdall for gun fittings, &c., is attached to the inside of each lid.

Fittings are attached to the rear of the box for securing two portable magazines.

A wrought-iron limber hook (No. 13), with a steel piece, is riveted to the inner futchels.

The axletree (No. 98) is of weldless steel tube with 2nd class arms; it is fixed to flanges, which are attached to the futchels.

The fittings for draught consist of a pole (12ft. 7in. long), two No. 10A swingletrees, a No. 2 supporting bar (3ft. 2½in. long), with a steel socket with two links at each end.

The wheels, No. 35A, are the same as those for the carriage.

The limber is fitted on the underside to carry a 3-lb. grease box and a No. 3 lubricating can, and on the "near" side of the platform board, a steel box for telescopic sight, also various stores as shown in packing diagram A.

On the issue to batteries of Marks II or IV guns the limbers will be altered to admit of the spare parts, &c., for those guns being conveniently carried.

† The limbers for carriage and ammunition wagons are alike.

‡ When the compartment for tubes is not full it will be packed up with sponge cloths, to prevent jolting.

§ These aluminium trays are being replaced by wood blocks.

†Limber, Field, B.L., 12-pr., Mark II.

(*Plate X.*)

The limber consists of a steel frame, a limber hook, a 2nd class axletree, a pole with pole bar, two swingletrees, an ammunition box, and two field wheels.

The frame consists of four futchels, connected by front and rear plates; platform and footboards are fitted to the top, and draught hooks for the swingletrees to the front of the outer futchels.

A wrought iron limber hook (No. 19), is riveted to the inner futchels and the rear connecting plate.

The axletree, No. 98, is of weldless steel tube; it is fixed in flanges, which are attached to the futchels.

The fittings for draught consist of a No. 17 pole (12 feet 7 inches long); two No. 10A swingletrees (2 feet 4 inches long) fitted at each end and in the centre with a steel loop (the end loops are fitted with two links for "rapid" release); and a No. 2 supporting bar (3 feet 2½ inches long), having a steel socket with two links at each end.

The ammunition box is of wood; it is fitted with guard irons and opens at the rear. The lid opens downwards, and serves as a shelf for fuzing shell; it is prevented from falling below the horizontal position by means of stop plates and stops attached to it and to the sides of the box. The box is divided into two compartments; the lower compartment is arranged to carry a supply of shrapnel shell, case shot, and cartridges in carriers, each carrier containing four cartridges in a tin box, and four shrapnel shells or two case shot respectively; also a tray for carrying an axial vent, obturator, and certain small stores; the upper compartment to carry three fuze boxes, (No. 31), two boxes for T-tubes and a tray for small stores.

The limber is fitted on the underside to carry a 3-lb. grease tin and a No. 3 lubricating can, and on the "near" side of the platform board a steel box for telescopic sight.

The wheels are 2nd class "C," No. 35A, same as for the carriage.

The limber is fitted to carry various stores, as shown in packing diagram B.

Half the limbers per battery will be fitted with loops for kicking straps.

Wagon, Ammunition, B.L., 12-pr., 6 cwt., Mark I.

(*Plate XIII.*)

The wagon consists of a steel frame, a hollow box perch, and an ammunition box, mounted on a 2nd class axletree, and field wheels.

The frame consists of two flanged sides connected by a rear plate and diagonal stays. A platform and a footboard are fitted to the sides and perch in the front, and at the rear, brackets are fitted for a wood shelf to facilitate the setting of fuzes, also fittings to carry portable magazines.

Two wooden boxes, each carrying a 14 lb. grease tin, are fixed by bands to the under side at the rear.

The perch, which is connected to the frame, is made of steel plate; it is fitted with a perch eye (No. 7), with a steel piece, and movable locking plates.

The ammunition box is generally similar to that described for the limber, but differs in the arrangement of the internal fittings. Two cartouches, each holding 24 cartridges, a small holdall containing gun

† The limbers for carriage and ammunition wagons are alike.

fittings, and three fuze boxes (No. 20), are carried in suitable compartments.

The axletree (No. 99) is of weldless steel tube with 2nd class arms. The wheels are No. 35A, the same as for the carriage and limber.

A tire brake is provided, which acts on the front of the wheels, and is applied by means of a handle at the rear of the wagon.

The wagons are fitted to carry various stores as shown in packing diagram A.

On the issue to batteries of Marks II or IV guns, the wagons will be altered to admit of the spare parts, &c., for those guns being conveniently carried.

Wagon, Ammunition, B.L., 12-pr., 6 cwt., Mark II.

(Plate XIV.)

The wagon consists of a steel frame, a hollow box perch fitted with trail eye and ammunition box, a 2nd class axletree, and two field wheels.

The frame consists of two flanged sides connected by a rear plate and "channel" stays; platform and footboards are fitted to the sides and perch in the front. Two wooden boxes, each carrying a 14 lb. grease tin, are fixed by bands to the underside at the rear.

The perch, which is connected to the frame, is made of steel plate; it is fitted with a perch eye (No. 9), and with locking plates.

The ammunition box is generally similar to that described for the limber, but is larger and differs in the arrangement of the internal fittings; it also has a front compartment, with a lid opening at the top, and is fitted to carry 4 ammunition carriers, marline, and hambro line.

The axletree is No. 99. The wheels (No. 35A) are the same as for the limbers.

The wagon has a tire brake similar to the Mark I wagon, and is fitted to carry a No. 93 spanner and various stores, as shown in packing diagram B.

A jointed pole (spare) and a handspike can be carried under the wagon, as shown on Plate XV.

Dimensions, &c.

	Carriage and Limber.		Ammunition Wagon and Limber.	
	Mark I*.	Mark II.	Mark I.	Mark II.
	ft. ins.	ft. ins.	ft. ins.	ft. ins.
Height to axis of gun	3 4	3 4	—	—
Length of wagon and limber	—	—	21 8	22 0
Length of carriage and limber with gun	24 9	24 8	—	—
Length of carriage and limber without gun	23 1	22 7	—	—
Length of axletree	6 2	6 2	6 2	6 2
Length between axletrees	9 0	8 1	7 3	7 4½
Greatest projection beyond track of wheels	0 6	0 6	0 6	0 6
Maximum width	6 2	6 2	6 2	6 2
Wheels track	5 2	5 2	5 2	5 2
Wheels height	5 0	5 0	5 0	5 0
Space required to turn in	33 0	29 8	30 0	30 0
Angle of trail (carriage trail on ground)	28½°	27° 45′	—	—
Angle of lock	62°	55°	60°	60°
Elevation, maximum	16°	16°	—	—
Depression, „	8°	8°	—	—
Upsetting angle	32°	38° 30′	33°	37° 30′

Average Weights.

(Fully packed with ammunition and stores, but without men or personal equipment).

	Carriage and Limber.		Amunition Wagon and limber.	
	Mark I*.	Mark II.	Mark I.	Mark II.
	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.	cwt. qr. lb.
Carriage, with gun	7 3 20	16 2 13	—	—
Limber { carriage	15 0 0	14 2 7	—	—
Limber { wagon	—	—	15 1 0	14 2 9
Wagon, ammunition	—	—	18 0 0	19 1 10
Carriage and gun, with limber	32 3 20	31 0 20	—	—
Wagon ammunition and limber	—	—	33 1 0	33 3 19
Carriage. Pressure of trail on ground	1 1 0	1 1 0	—	—
Wagon, ammunition. Pressure of perch on ground ..	—	—	1 2 0	—
Weight at end of pole limbered up	0 1 2	0 1 2	0 1 2	0 1 2

Wheel { No. 35A	1 3 10	
Wheel { „ 36	2 0 10½	
Wheel { „ 42	2 0 16	

Wagon, Forge, R.A., Mark I*.

Limbers, Wagon, Forge, R.A., Mark I**.

(Plate XXIV.)

These wagons and limbers are the Mark I pattern, converted to conform as far as possible to the Mark II pattern. Runners and guides are fitted to the tailboard and bottom of the wagon, to carry the Mark II G.S. field forge. The wagon is fitted with four under boxes and two lantern boxes (one for two distinguishing lanterns,† and one for two folding lanterns) on top, and four bale hoops for a canvas cover. The perch is fitted with a recessed plate to receive the plate of the clamping screw of the vice when in use.

A tire brake is provided, having cast-iron brake blocks, which act on the rear of the wheels. The brake is applied by means of a handle at the rear of the wagon.

The limber for this wagon is the Mark I pattern, fitted for pole draught, and with the limber box altered internally to conform to the limber box of the Mark II* and Mark III* limbers.

The pole draught will be the same as that for the carriage and wagon limber.

The wheels are 2nd class " C," No. 36.

The wagon and limber can be packed to carry either the stores of the Mark I*, or II equipments. (See packing diagram C.)

† Distinguishing lanterns are carried with ammunition columns only.

Dimensions, &c.

	ft.	in.
Total length with pole	23	1
Maximum width	6	4
Length between axles	7	7½
Wheels { track	5	2
Wheels { diameter	5	0
Space required to turn in	32	0
Angle of lock	58°	
Upsetting angle, packed	35°	
Rectangular space occupied in boats	14 ft. 2 in. × 6 ft. 4 in.	
Tonnage { for shipment	6·83 tons.	
Tonnage { „ transport in boats	17 „	

Weights (Approximate).

(Packed, including equipment.)

	cwt.	qr.	lb.
Wagon and limber	44	3	0
Wagon and limber { weight on two fore wheels	17	2	0
Wagon and limber { „ „ hind „	27	1	0
Wagon (perch on ground)	28	2	18
Limber	16	0	10
Weight at end of pole	0	1	6
Pressure of perch on ground	3	2	0

Wagon Forge, R.A., Mark II and II*.
Limber, Wagon, Forge, R.A., Mark II*.

(Plate XXIV.)

The wagon consists of a frame of angle iron, a perch, and an axletree built up on the box girder principle, and two field wheels.

The perch is formed of two pieces of "channel" iron connected by collar bolts, top and bottom plates, and a perch eye (No. 4), which is riveted between them at the front; it is fitted to carry an anvil and block on the top. On the top of the perch two holes are drilled to receive a vice, and a recessed plate is attached to receive the plate of the clamping screw of the vice when in use.

The frame of the wagon is boarded over, and fitted with side boards and movable head and tailboards, to form the body of the wagon.

The body is divided into two compartments by a cross partition. The hind compartment is covered with a lid which is hinged to the partition. The front compartment is covered by two removable cutting boards and a narrow flap, which is hinged to the cover of the hind compartment. Two tool chests (one for smiths' tools and one for wheelers' tools) are carried in the front compartment. Angle plates are fitted to the bottom and to the tailboard, so that the wagon may take either a "Forge, field, R.A., Mark IV," or "Forge, field, G.S., Mark II;" when the latter is carried the wagon will be described as Mark II*.

The wagon is fitted with a tiro brake similar to the Mark I* wagon (p. 20), also with four under boxes, two lantern boxes (one for two distinguishing† lanterns, and one for two folding lanterns), and four bale hoops for a canvas cover.

The limber for this wagon is the Mark II pattern, fitted for pole draught, and with a limber box arranged internally for cans, boxes, and tins to carry the oil, dubbing, &c., allowed for this equipment.

The pole draught is the same as that for the carriage and ammunition wagon limbers.

† Distinguishing lanterns are carried in the ammunition column only.

The wheels are 2nd class "C," No. 36.

The wagon and limber can be packed to carry either the stores of the Mark I*, or II equipments. (See packing diagram C.)

Dimensions, &c.

	ft.	in.
Total length with pole	23	3
Maximum width	6	4
Length between axles	7	9
Wheels { track	5	2
Wheels { diameter	5	0
Space required to turn in	32	0
Angle of lock	58°	
Rectangular space occupied in boats	14 ft. 5 in. × 6 ft. 4 in.	
Upsetting angle, packed	35°	
Tonnage { for shipment	7·21 tons	
Tonnage { for transport	16·93 „	

Weights (Approximate).

(Packed, including personal equipment.)

	cwt.	qr.	lb.
Wagon and limber	44	2	0
Wagon and limber { weight on two fore wheels	17	1	14
Wagon and limber { „ „ hind „	27	0	14
Wagon (perch on ground)	28	2	4
Limber	15	3	24
Weight at end of pole	0	1	0
Pressure of perch on ground	3	2	0

Wagon, Store, R.A., Mark I.
Limber, Wagon, Store, R.A., Mark I*.

(*Plate XXV.*)

The wagon is similar to the forge wagon Marks II and II*, but the body is divided into three compartments, which are covered with lids. The front and centre compartments are fitted to carry stores, and the rear compartment a stationery box, the front of which can be let down on the tailboard (when the latter is supported by chains) to serve as a writing desk.

The wagon is fitted on the top to carry a lantern box for two folding lanterns, a chest of collar-makers' tools, luff tackle, reaping hooks, and spare swingletrees.

A tire brake having cast-iron brake blocks is provided, which acts on the rear of the wheels, and is applied by means of a handle at the rear of the wagon.

The limber is the same as that described for the Mark II forge wagon, but the limber box differs in its internal fittings.

The wheels are 2nd class "C," No. 36.

The wagon and limber can be packed to carry either the stores of the Mark I*, or II equipments. (See packing diagram D.)

Dimensions, &c.

	ft.	in.
Total length with pole	23	2
Maximum width	6	4
Length between axles	7	10
Wheels { track	5	2
Wheels { diameter	5	0
Space required to turn in	32	
Angle of lock	58°	
Upsetting angle	35°	
Rectangular space occupied in boats	14 ft. 2½ in. × 6 ft. 4 in.	
Tonnage { for shipment	6·82 tons.	
Tonnage { for transport in boats	16·68 „	

Weights (Approximate).

(Packed, including personal equipment.)

	cwt.	qr.	lb.
Wagon and limber	39	1	2
Wagon and limber { weight on two fore wheels..	15	2	3
Wagon and limber { „ „ hind „ ..	23	3	9
Wagon (perch on ground)	24	2	19
Limber	14	2	21
Weight at end of pole	0	1	0
Pressure of perch on ground	2	2	3

Wagon, Store, R.A., Mark II.

Limber, Wagon, Store, R.A., Mark II*.

(Plate XXVI.)

This wagon consists of a frame of angle steel, a steel perch, a tubular axletree, and two field wheels; the body is fitted with four wooden boxes, secured by nib irons and thumb screws; the three front boxes are for carrying stores, and the rear box for stationery.

The perch is formed of steel plate, bent so as to form a tapering box girder, and fitted with a perch eye (No. 7). Two propsticks are fitted on the under side.

The axletree is tubular steel, 2nd class "C," No. 38.

The wagon is fitted with a tire brake similar to the Mark I wagon (p. 22), also with four bale hoops and a canvas cover.

The stores carried on the top of the wagon are the same as those for the Mark I.

The limber is generally similar to the carriage limber, but is fitted with a special box for stores.

The wheels are 2nd class "C," No. 36.

This wagon and limber can be packed to carry the stores of either the Mark I*, or II equipments. (See packing diagram E.)

Dimensions, &c.

	ft.	in.
Total length with pole	22	9
Maximum width	6	2
Length between axles	7	9½
Wheels { track	5	2
Wheels { diameter	5	0
Space required to turn in	29	4
Angle of lock	60°	
Upsetting angle, packed	29½°	
Rectangular space occupied in boats	14 ft. 2 in. × 6 ft. 2 in. × 7 ft. 3 in.	
Tonnage { for shipment	8·127 tons.	
Tonnage { transport in boats	16·089 „	

Weights (Approximate).

Packed (including personal equipment).

	cwt.	qr.	lb.
Wagon and limber	35	2	0
Wagon and limber { weight on two fore wheels	15	2	0
Wagon and limber { „ „ hind „	20	0	0
Wagon (perch on ground)	21	1	0
Limber	14	1	0
Weight at end of pole	0	1	11
Pressure of perch on ground	1	3	17

Wagon, Ammunition and Store, R.A., Mark II*.

(Plate XVI.)

The body of this wagon consists of a framework formed by two sides, *a*, and two summers mortised into a front and rear carbed, *b*. This framework is strengthened by plates riveted on the inside; it is housed and bolted to a front bolster, *c*, a cross bar, *d*, and a rear bolster, *e*. In front and rear of the front bolster, front and rear wheel bolsters, *ff*, are bolted to the summers, and to these three the upper wheel plate, *g*, is attached. The front bolster is shod with a friction plate, and is plated at the sides.

The body is supported over the hind axle upon two side stays of T-iron, and a cross stay of round iron. Each side stay rests in an axle block of oak upon the shoulder of the axletree, where it is secured by axletree staples, by a clip plate, and by the end of the cross stay, which latter serves as a coupling plate.

The frame is boarded over to form the bottom of the wagon, and movable sides, A, head-board, B, and tail-board, C, are fitted to it.

A locker is formed in front of the wagon body by a sliding partition. The lid of the locker is fitted with a raised box and driving seat, *k*, a back board, *l*, being hinged to it, and a footboard, *m*, to the head-board of the wagon. A small locker, *n*, is also formed between the summers underneath the rear of the wagon.

These wagons are now fitted with cranked guard-irons, and the driver's seat is made slightly higher for convenience in driving with long reins. The footboard is increased in length and width, and fitted with a long toepiece, and further supported by iron stays fitted to its under side and to the front carbed.

The fore carriage of the wagon is formed of four futchels, *o*, housed in and bolted to a splinter bar, *p*, and a cross bar, *q*. An upper bolster, *r*, is bolted over, and an under bolster, *s*, beneath the centre of the futchels. A wheel plate is attached to the upper bolster, to the cross bar, and to a small wheel bolster, *t*, placed in front. The upper bolster is shod with a friction plate, and both it and the lower bolster are strengthened by plates.

The frame of the fore carriage is supported over its axle in the same manner as the body over the hind axle.

The wagon is fitted for pole draught, which consists of a pole, bar supporting pole, and two swingletrees; also with a tire brake having cast iron brake blocks which act on the rear of the hind wheels. The brake is applied by means of a handle at the rear of the wagon.

The body and fore carriage are connected by a main pin, which is passed through bolster plates in the main bolsters, and is keyed beneath.

The footboard is of elm, the other boarding of yellow deal, and the remainder of the woodwork of the wagon of oak.

The fore wheels† are 2nd class B, No. 28, 3 feet 4 inches in diameter, the hind† 2nd class C, No. 35A, 5 feet in diameter. The axles are 2nd class.

The wagon is fitted to carry a spare fore wheel, and entrenching tools. A locking plate, *u*, is attached beneath the frame to prevent the fore wheel injuring the latter in wheeling on rough ground.

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† Earlier issues of these wagons may be found with Nos. 33 (fore) and 32 or 30 (hind) wheels; these will be replaced as they become unserviceable by Nos. 28 and 25A.

Clip plates are attached to the floor (at the rear) of the wagon to take the bracket portion of a spare wheel arm, which will be supplied with such wagons as are allotted for carrying spare gun wheels.

The following articles belong to the wagon, namely, five bale hoops, *a*, a canvas cover (waterproofed or painted khaki colour) with two lashing ropes, bar stay, three lashing ropes to secure the spare wheel, two half-round grease boxes, and a rolling scotch.

The bale hooks are of ash, fitted with leather stops, and numbered from one upwards, commencing with the front hoop, a corresponding number being placed upon the wagon side at the upper staple for the bale hoop. The front hoop has also the register number of the wagon painted upon it.

The bar stay is of ash, to fit from side to side, and keep the sides from spreading out when the wagon is packed and the tailboard down.

The extreme load is 2 tons.

Weight		26¾ cwt.
Tonnage	for shipment	4·659 tons
	for transport in boats	12·839 „
Rectangular space occupied in boats ..		11 ft. 4 in. × 6 ft. 3 in.
Upsetting angle		36°
Angle of lock		103°
Space required to turn in		23 ft. 7 in.

A certain number of Mark III wagons have been made, but they differ from the Mark II* wagon in a few manufacturing details only.

Wagon, Ammunition and Store, R.A., Mark IV.

(*Plate XVI.*)

The body of the wagon consists of a framework, formed by two sides, and a central summer, housed to a front bolster, centre crossbar, wheel-plate bolsters, rear crossbar, and rear carbed. In front and rear of the front body bolster, front and rear wheel bolsters are bolted to the sides and summer, and to these three the wheel plate is attached.

The framework is boarded over to form the floor of the wagon, and fixed sides, partition for locker, and a tailboard, are fitted to it. The side frames and summers are extended to the front, and arranged to support a footboard.

A locker is formed in the front part of the wagon; it is built up above the sides of the wagon, and fitted with a back rail so as to form a driving seat. Access to the locker is obtained from the front by means of a hinged flap, which is secured by a hasp and turnbuckle.

The body is supported over the hind axletree upon two springs, which are attached by lugs to the centre crossbar and sides, to the carbed and sides by scroll irons, and to the axletree by clips, staples, and coupling plates.

A spare gunwheel can be carried at the rear of the wagon on a wheel arm, and a spare forewheel can be carried lashed under the wagon. Clip plates are attached to the floor of the wagon (at the rear) for the bracket portion of the spare wheel arm to fit into. The wheel arm will, however, only be issued for such wagons as are allotted to carry spare gun wheels.

The fore carriage consists of two futchels, main bolster, front and rear wheel plate bolsters, crossbars, and splinter bar. The bolsters and crossbars are housed on to the futchels, the former on top and the latter underneath. The upper part of the bolsters are shed with

friction plates to work against the wheel plate on the body. The fore carriage is supported over its axle upon two springs, which are attached to the crossbar by lugs, and to the axletree by clips, staples, and coupling plates. The splinter bar is fixed to the front of the futchels, and stayed to the front crossbar by round iron stays, the front ends of which are formed into draught hooks.

The wagon is fitted for pole draught, and with a tire brake similar to the Mark II* wagon (page 24).

The body and fore carriage are connected by a main pin, which is passed through the summer and main bolsters, and is keyed beneath.

The fore wheels are 2nd Class "B," No. 28, 3 feet 4 inches in diameter, and the hind wheels, 2nd Class "C," No. 35A, 5 feet in diameter.

The fore axletree is 2nd Class B, and the hind axletree, 2nd Class C.

The wagon is provided with staples for bale hoops, and lashing hooks for canvas cover, also with two grease boxes, and a rolling scotch. The canvas cover is waterproofed or painted khaki colour.

Weight	19 cwt. 8 lbs.
Extreme load	40 „ 0 „
Tonnage { for shipment..	8·4 tons.
Tonnage { for transport in boats	14·665 tons.
Rectangular space occupied in boats	12 ft. 7 in. × 6 ft. 3 in.
Upsetting angle	33°
Space required to turn in	25 ft.

Certain wagons of this description when used for carrying baggage or tents will be supplied with raves on each side, and a "cover, wagon, G.S., Mark IV."

Note.—The stores carried in this wagon are laid down in the Tables of Equipment.

Care and Preservation of Carriages, &c.†

See "Regulations for Care and Preservation of War Matériel and for Magazines."

Special Instructions not in above-mentioned Regulations.

All rubbing parts of the carriage spring cases should be greased before being put together. The disc under the leather cap of the rear spring, and the telescopic cases of the spring under the axle should be occasionally oiled, and grit and dirt wiped off.

In all cases where nuts are not prevented from shaking loose by split keys, the end of the bolt should be slightly riveted over the nut after screwing up.

When it is required to remove the axletree, the left flange, which is bolted on, must be taken off.

To replace springs in rear spring case, remove the shackle and pin connecting the wire rope to the rod, remove the leather cap and withdraw springs and rod, place new springs on the rod and screw up to the required length before inserting in the spring case; replace the shackle connecting wire rope, also the leather cap.

To replace springs in front spring case, remove the split key and set screw securing the case to hinge, and unscrew the outer case,

† For detailed instructions as to method of carrying out repairs, &c., see "Handbook for Military Artificers."

insert new spring, screw up the outer case and replace the set screw and split key.

When brake blocks require to be replaced, they must be driven out of the shoes from the underside.

When the split pin for locking the spade releasing lever is removed, to enable the spade to fall, it must not be replaced until after the spade is put up in the travelling position, or the pawl may be injured.

Special attention should be given to the springs for releasing levers, and at any appearance of weakness or injury they should at once be renewed.

Care must be taken in securing the spare pole under the ammunition wagon, it must be disconnected at the joint, and lashed in the position shown on *Plate XV*, so that it will be clear of the brake handle when applying the brake.

AMMUNITION.

CARTRIDGES.

Cartridge, B.L. $12\frac{7}{16}$ oz. cordite, size 5.
Cartridge, B.L., $1\frac{1}{4}$ lb. blank.

(*Plate XVII.*)

The Mark I cordite cartridge is made of red shalloon, $7\frac{3}{4}$ to $8\frac{1}{4}$ inches long, sewn with one row of silk, the bottom circular, and sewn with two rows of silk. The charge consists of $12\frac{7}{16}$ oz. cordite, size 5, made up in a bundle, and tied in three places with two turns of silk twist. A primer of 4 drams R.F.G.2, or new blank F.G. powder is placed at each end of the cartridge. The dimensions are:—

Length (not to exceed)	..	..	6·2 inches.
Diameter ,, ,,	..	..	2·2 ,,

The Mark II cartridge differs from Mark I only in the primer, which consists of one dram of guncotton yarn, stemmed in at each end.

The saluting charge is $1\frac{1}{4}$ lb. blank L.G. powder in a cartridge of No. 1 silk cloth, choked with silk twist, and hooped with three silk braids.

Length (not to exceed)	..	..	5·5 inches.
Diameter ,, ,,	..	..	3·0 ,,

PROJECTILES.

Nature.	Diameter.		Length.	Bursting charge.		Weight filled and fuzed.
	Body.	Band.		Nature.	Weight.	
	in.	in.	in.		oz.	lb. oz.
Shell, Shrapnel, Marks II to VII	2·98	3·09	8·349	R.F.G.2	$1\frac{1}{4}$	12 8
Shot, case, Mark V ..	2·97	3·09	9·0†	..	..	13 4

† Over handles—Length over body, 8·5 inches.

Shrapnel Shell.

(Plates XVIII and XIX.)

Mark II.—The body of the shell is of forged steel. At a distance of 0·45 inch from the base, a groove is turned; three ridges project on the groove, and six axial chisel marks are cut across the ridges to prevent the driving band turning on the shell.

The head of the shell is made of charcoal iron, or Bessemer steel, struck with a radius of one and a half diameters; is truncated and screwed to receive a gunmetal socket; the interior of the socket is bored and screwed to the G.S. taper.

In the base of the shell is fitted a sheet iron (tinned) cup to contain the bursting charge. A steel disc rests on the shoulder in the bottom of the shell to support the metal balls; into the disc screws the lower end of the central tube; its upper end being secured after passing through the socket, by a gunmetal nut. The top of the tube is screwed internally to receive a primer.

The shell is lined with brown paper. A steel wire cage, with steel disc attached, is inserted in the shell to contain the metal balls. The cage consists of 12 vertical wires soldered in the slots round the circumference of the steel disc; a piece of flattened iron wire is wound round the outside of the vertical wires in the form of a spiral.

The cage is fitted with 156 mixed metal balls, 35 to lb., the interstices being filled with resin (any deficiency in the weight of the shell is made up with buck-shot).

The head of the shell is fitted with a block of wood and felt washer; and is attached to the body by screws and pins. A steel disc is placed in the head over the balls.

The general form of the shell is shown on the Plate.

Mark III differs from Mark II in having the metal balls contained in a perforated tin cylinder, and a stronger steel disc over the chamber which contains the bursting charge. This shell, with undercut grooves for driving band, is designated Mark IV, and with the new pattern driving band (*see Plate XVII*) it is known as Mark V. Some *Mark I* shells have had their contents altered to render them practically identical with Mark III, such shells will be known as Mark I*.

Mark VII‡ differs from Mark V in the form of driving band (*see Plate XIX*), the ribs in the groove for the band being "waved," and the number of balls being about 182 (41 per lb.).

NOTES.—The shell should only be carried fuzed—

(*a*) On active service, when in the judgment of the battery commander, it is desirable to be prepared for immediate action.

(*b*) At practice camps, when necessary for the rehearsal of (*a*).

It must be remembered that the fuzes when once taken out of their cylinders gradually deteriorate; shell should therefore not be fuzed earlier than is necessary.

When the fuze is placed in the shell in accordance with (*a*) and (*b*) above, the beckets of the safety pins should be looped over the nut of the fuze. This is to prevent safety pins being jolted out when travelling, and avoid the possibility of the beckets being rubbed between the lid and the ammunition box, and thus becoming liable to break when the safety pins are pulled. In the event of beckets

‡ Mark VI shrapnel shell is restricted to Q.F. 12-pr. guns.

becoming broken, or too short, through shrinkage, to fit over the nuts, officers commanding batteries will improvise some means of securely fixing the beckets.

Note.—On an emergency, a 15-pr. B.L. shell (*not charge*) may be fired from a 12-pr. B.L. 6 cwt. gun (75/12/5877). The M.V. with a 15-pr. shell is 1,478 f.s. and the pressure per square inch 16·075 tons.

Case Shot.

(*Plate XX.*)

Mark V is made of XXS tin, in one piece, lap jointed and soldered. The base is made of iron and is fitted with a copper driving band, and a straight handle; the upper portion of the base is recessed to receive the driving band. The body has an inside lining of two steel segments, and contains 290 mixed metal balls (34 per lb.), the interstices being filled with a mixture of equal quantities of clay and sand. A disc of iron, or mild steel, rests on top of the base inside the lining. The top is closed by a disc of iron or mild steel.

The base is secured to the body by the bottom of the latter being pressed into the recess for, and being held by the driving band; the bottom of the recess is milled.

FOR INSTRUCTIONS RESPECTING THE PREPARATION, &c., OF PROJECTILES.

See "*Regulations for Care and Preservation of War Matériel, and for Magazines.*"

Fuze, Time and Percussion, No. 56, Mark IV.†

(*Plate XXI.*)

The fuze consists of the following parts (made of gunmetal, except when otherwise stated), viz.:—Body, detonator plug with detonator, percussion pellet, brass spiral spring, base plug, brass safety pellet, brass ball, composition ring, dome, brass washer, cap, two safety pins and two leather washers.

The *body* is screwed at the lower end to G.S. fuze hole gauge, and is bored from the bottom to receive a percussion pellet and base plug. Two holes are bored beyond the recess for percussion pellet, one for the detonator plug, the other for the safety pellet.

The *detonator plug* is screwed on the outside and fitted with a detonator covered with a brass disc.

The hole bored for the detonator plug is continued above it to form a small magazine filled with F.G. powder. In the top of the body is bored a recess to contain a perforated pellet of pressed pistol powder, which communicates with the magazine by a hole bored at right angles to the axis of the fuze. The stem on the body is screwed on top to take the cap, two grooves being cut in the top end of stem to receive the feathers on the brass washer. A groove is cut in the top face of body, close to the stem, and half way round it, and a gas

† Will be superseded by No. 60 when existing stock is used up.

escape hole bored obliquely through the body into the groove. A small tablet of fine white paper is secured with shellac to the body of the fuze over the perforated powder pellet, and over it two washers of fine white paper and calfskin are secured with shellac, a hole being cut through the washers and tablet immediately over the powder pellet.

The *percussion pellet* has a cut in the side for the safety pellet and ball to fall into when set in action. A hole is made transversely through the pellet and fitted with a brass retaining bolt, held in position by a brass spiral spring. The pellet contains a powder charge of F.G. powder. A small set screw in the wall of the body fits into a slot in the percussion pellet to prevent it from turning in flight. A spiral spring of brass wire is placed between the percussion pellet and detonator plug.

The *base plug* contains a perforated pellet of pressed powder, secured by a brass washer spun over on top, and is closed at the bottom by a shalloon disc and brass washer spun in. The plug is fixed by stabbing in three places.

The *safety pellet* has a slot cut in the side to clear the brass ball, and is suspended in the body by a thin copper wire passing through it. A hole is also bored in the upper part of the pellet and body of fuze for the safety pin to pass through.

The *composition ring* has a chamber on one side and three projections on the inside to keep it concentric with the stem of the body. The chamber has a hammer with a steel needle suspended in it by a copper wire over a patch of detonating composition. A safety pin also passes through the hammer and chamber. The ring has a groove on the underside filled with composition and connected with the chamber by a lighting hole. The outside of the ring is graduated from 0 to 18, each division being subdivided into halves and quarters, with a broad arrow at the point where the groove is interrupted by a bridge soldered in.

The *dome* is made of sheet brass.

The *washer* is made of sheet brass with two feathers, which fit into featherways cut in the top of the stem. When screwing up the cap the washer remains stationary, thus preventing the dome from turning and altering the setting of the fuze.

The *cap* is made of gunmetal, hexagonal in form, and screws on the stem of the body.

The fuze is stamped T on the composition ring close to the time safety pin,† and P on the body close to the percussion pin.

The fuze should be set *before* the safety pins are withdrawn.

To set the time arrangement, the cap is loosened with the "key, fuze, universal," and the ring moved round until the graduation ordered is exactly in line with the arrow, or black triangular mark, on the body; the fuze is then clamped by screwing down the cap as tightly as possible, care being taken that the ring and dome have even bearings.

If the fuze is required to act as a percussion fuze only, the P pin should be withdrawn and the T pin left in position; otherwise both pins should be withdrawn; but this should not be done till the moment of loading.

Action.—On discharge, if the time safety pin has been withdrawn, the hammer sets back, shearing the suspending wire and igniting the time ring, which burns until it comes over the detonator and the

† In future manufacture the time safety pin will have a scarlet loop.

pellet, and so flashes down through the radial magazine, detonator pellet, and base plug, and into the shell.

If the percussion pin has been withdrawn, the safety pellet sets back, shearing the suspending wire, and the brass ball falls down into the space over the safety pellet. The centrifugal bolt, owing to the rotation of the shell, is withdrawn, the percussion pellet is free to move forward on impact and ignite the detonator, which flashes through the percussion pellet and base plug into the shell.

At rest it burns about 13 seconds.

These fuzes are issued 1 in a tin cylinder.

Fuze, time and percussion, No. 60, Mark I.

The fuze is generally similar in construction to No. 56, Mark IV, described above, but differs in the following particulars:—

1. There are two time rings, with an escape hole in each.
2. The dome is shorter.
3. The graduations are from 0 to 44.
4. A pressed powder pellet, with loose F.G. powder on top, is contained in the percussion pellet.
5. A pressed powder pellet is inserted at the termination of the channel in the bottom time ring.
6. A muslin disc is secured to the bottom of the needle plug, to the brass washer of the percussion pellet, and to the white fine paper disc over the pellet powder in the base plug.
7. The time of burning at rest is about 20 seconds.

Fuze, Drill, Time and Percussion, No. 56, Mark I.†

The fuze is of the Service pattern but is issued empty. It is provided with special safety pins which can be withdrawn and replaced as required. To facilitate identification the dome of the fuze is bronzed.

Tubes.

T Friction Tube, Marks I*–IV.

(Plates XXII and XXIII.)

Mark II.—The form and general dimensions of the tube are shown on the plate. It consists of the following principal parts:—Body (*a*), head (*b*), ball (*d*), plug (*e*), friction wire (*f*).

The head is of gunmetal, the body of solid drawn brass, the ball of soft copper, and the friction bar of half round copper wire, twisted into a round bar, with a loop at one end and the other roughened. A hole in the side of the head of the tube over the friction wire is charged with about 2 grains of detonating composition in the form of a paste laid over the roughened part of the friction wire. A gut skin disc (*g*) is placed over the composition, and a shellaced cork plug (*h*) inserted over the disc, the hole being filled up flush with shellac cement. The body is charged with 8 grains of pistol powder, and is closed with a shellaced cork plug (*i*) covered with shellac cement, and a paper disc (*k*).

A brass pin (*c*) is inserted to prevent the body becoming unscrewed. The upper part of the body has a central perforation, which is enlarged in its lower part into a conical recess. The ball

† See footnote † page 29.

(*d*) is placed in this recess, and is retained therein by a screwed plug (*e*) pierced by three fire holes.

On the withdrawal of the friction bar, the detonating composition is ignited, and the flash, passing down the perforation in the head and through the plug, fires the powder charge. The ball is driven upwards by the explosion, and seals the tube. This, together with the mode in which the tube is held in the special vent employed with it, prevents the escape of gas.

The body is lacquered inside and outside.

Mark III differs principally from Mark II in the method of fixing the friction bar, which is suspended by a "shearing" wire at the base of the loop.

Mark IV differs from *Mark III* in having the loop of the friction wire made larger, and the opening in the head correspondingly altered.

Some Mark I and Mark II tubes have been converted to conform generally to Mark III. Such tubes will be known as Mark I and Mark II* respectively.*

Total length of tubes .. .. .. 1·9 inch.

The tubes are issued in square tin boxes, 10 in a box. Both the top and the bottom of the box are removable, being secured by soldered bands, and the tubes are so arranged that five may be withdrawn from the top and five from the bottom.

NOTES.

In the event of a tube failing to ignite a charge, care should be taken in extracting the fired tube not to stand directly in rear of the howitzer, as the gas generated will cause the tube to fly out with some violence so soon as the T head is clear of the recess in the vent.

The vent channel sometimes becomes choked with residue from the cartridge. When this occurs, the taper portion should be cleared with a "rimer vent, T," sufficiently to allow of the insertion of a tube which, when fired, will remove the rest of the obstruction.

Tubes, after firing, are to be returned to Woolwich to be repaired and refilled; they should be immersed in mineral oil within 24 hours after firing, for which purpose $\frac{1}{2}$ gallon of oil per 100 tubes —of which 2 ounces ($\frac{1}{10}$ pint) would be used up in the treatment— is allowed.

T Friction Tube Drill, Mark I.

(*Plate XX.*)

The drill tube is made of hardened steel, of the same external shape as the Service tube. The head is grooved to receive a hardened steel spring, which is attached in the groove by a screw from the under side of the head. The end of the spring is bent down to nearly meet the bottom of the groove, which is raised to form a jaw, through which the hook of the lanyard can be drawn by a pull of about 50 lb.

Total length .. .. .. 1·9 inch.

MEKOMETERS.

For information concerning Mekometers, *see* the Mekometer Handbook, also "Regulations for Care and Preservation of War Matériel and for Magazines."

Range Table for 12-pr. B.L. Gun of 6 cwt. Mark I.

Based on Practice of 21.6.93.
Published February, 1896.

Charge, { weight, $12\frac{7}{16}$ oz. / gravimetric density, $\frac{90{\cdot}05}{0{\cdot}307}$. / nature, cordite, size 5.

Projectile, { nature, Shrapnel shell. / weight, $12\frac{1}{2}$ lb.

Muzzle velocity, 1,553 f.s. $\frac{54}{\text{Art.}\ 1224}$

Nature of mounting, travelling, field.

Jump, + 26 minutes.

Remaining velocity.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Slope of descent.	Elevation.	Range.	Fuze scale for fuze time and percussion, No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
	Range.	Laterally or vertically.						Length.	Breadth.	Height.	
f.s.	yds.	yds.	° ′	1 in	° ′	yds.		yds.	yds.	yds.	secs.
1477	50	0·11	...	343	−0 06	100	$\frac{1}{4}$	17	0·14	0·05	0·24
1432	50	0·29	...	171	−0 14	200	$\frac{3}{4}$	17	0·14	0·11	0·48
1390	50	0·43	0 1	118	0 21	300	1	17	0·14	0·16	0·72
1349	50	0·58	0 1	88	0 28	400	$1\frac{1}{4}$	17	0·14	0·21	0·96
1309	50	0·72	0 1	71	0 36	500	$1\frac{1}{2}$	17	0·14	0·25	1·20
1270	49	0·87	0 1	59	0 45	600	$2\frac{1}{4}$	18	0·15	0·32	1·45
1235	49	1·01	0 2	49	0 54	700	$2\frac{1}{4}$	18	0·16	0·40	1·70
1200	49	1·16	0 2	43	1 03	800	3	19	0·18	0·47	1·95
1168	48	1·31	0 2	37	1 11	900	$3\frac{1}{4}$	19	0·20	0·56	2·20
1137	48	1·45	0 3	33	1 20	1000	$3\frac{3}{4}$	20	0·24	0·64	2·45
1108	47	1·60	0 3	29	1 29	1100	$4\frac{1}{4}$	20	0·28	0·74	2·71
1080	46	1·74	0 3	26	1 38	1200	$4\frac{3}{4}$	20	0·33	0·85	2·98
1059	45	1·89	0 3	23	1 47	1300	5	21	0·38	0·97	3·24
1038	44	2·03	0 4	21	1 57	1400	$5\frac{1}{2}$	21	0·44	1·09	3·51
1022	43	2·18	0 4	19	2 07	1500	6	22	0·50	1·22	3·78
1006	41	2·32	0 4	17	2 18	1600	$6\frac{1}{4}$	22	0·57	1·35	4·05
990	40	2·47	0 5	16	2 29	1700	$6\frac{3}{4}$	23	0·64	1·51	4·34
975	39	2·61	0 5	14	2 40	1800	$7\frac{1}{4}$	23	0·72	1·66	4·63
961	37	2·76	0 5	13	2 53	1900	$7\frac{1}{4}$	24	0·81	1·82	4·92
947	36	2·91	0 6	12	3 86	2000	$8\frac{1}{4}$	24	0·90	2·00	5·22
933	35	3·05	0 6	11	3 20	2100	$8\frac{3}{4}$	25	1·00	2·23	5·52
920	34	3·20	0 6	11	3 34	2200	$9\frac{1}{4}$	26	1·11	2·46	5·83
907	33	3·34	0 7	10	3 50	2300	$9\frac{3}{4}$	27	1·22	2·70	6·14
894	32	3·49	0 7	9·2	4 06	2400	10	28	1·34	3·03	6·45
881	31	3·63	0 8	8·7	4 22	2500	$10\frac{1}{4}$	29	1·45	3·36	6·78
869	30	3·78	0 8	8·1	4 39	2600	$11\frac{1}{4}$	30	1·58	3·70	7·11
857	29	3·92	0 9	7·6	4 57	2700	$11\frac{3}{4}$	32	1·69	4·30	7·46
846	29	4·07	0 9	7·1	5 15	2800	$12\frac{1}{4}$	35	1·66	4·93	7·81
834	28	4·21	0 10	6·7	5 34	2900	$12\frac{3}{4}$	39	1·62	6·75	8·16
823	28	4·36	0 10	6·3	5 54	3000	$13\frac{1}{2}$	54	1·57	8·57	8·52
813	27	4·51	0 11	6·0	6 14	3100	14	60	1·52	10·0	8·89
803	26	4·65	0 11	5·6	6 34	3200	$14\frac{3}{4}$	67	1·46	11·9	9·27
793	26	4·80	0 12	5·3	6 56	3300	$15\frac{1}{4}$	73	1·40	13·7	9·66
783	25	4·94	0 12	5·0	7 18	3400	$15\frac{3}{4}$	78	1·35	15·6	10·06
773	24	5·09	0 13	4·7	7 40	3500	$16\frac{1}{2}$	82	1·30	17·2	10·47
763	24	5·23	0 13	4·5	7 03	3600	17	86	1·26	18·8	10·88
753	23	5·38	0 14	4·3	8 26	3700	$17\frac{3}{4}$	88	1·22	20·4	11·32
744	22	5·52	0 14	4·1	8 49	3800	...	90	1·19	21·7	11·77
735	22	5·67	0 15	3·8	9 12	3900	...	91	1·16	23·0	12·22
726	21	5·81	0 16	3·6	9 36	4000	...	92	1·19	24·4	12·68
717	21	5·96	0 16	3·5	10 10	4100	...	93	1·23	26·2	13·16
708	20	6·11	0 17	3·3	10 26	4200	...	93	1·29	28·1	13·64
699	20	6·25	0 17	3·2	10 52	4300	...	94	1·37	29·9	14·13
690	19	6·40	0 18	3·0	11 18	4400	...	95	1·47	31·7	14·62
681	19	6·54	0 19	2·9	11 45	4500	...	95	1·57	33·4	15·12
672	19	6·69	0 20	2·8	12 12	4600	...	96	1·69	35·1	15·62
664	18	6·83	0 20	2·6	12 39	4700	...	96	1·81	36·9	16·12
656	18	6·98	0 21	2·5	13 07	4800	...	97	1·93	38·8	16·62
648	18	7·13	0 22	2·4	...	...	...	97	2·05	40·7	17·14
640	17	7·27	0 23	2·3	...	...	...	98	2·17	42·6	17·66
632	17	7·42	0 24	2·3	...	...	...	98	2·29	43·8	18·18
624	17	7·56	0 25	2·2	...	...	...	99	2·41	45·0	18·70

Range Table for 12-pr. B.L. Guns, Marks II* and III.

Based on Practice of 8 and 12.1.1900.

Dated 13.2.1900.

Charge, { weight, $12\frac{1}{16}$ oz. ; gravimetric density, $\frac{112{\cdot}6}{0{\cdot}2464}$. ; nature, cordite, size 5.

Projectile, { nature, forged steel, shrapnel, Mark III. ; weight, $12\frac{1}{2}$ lb.

Muzzle velocity, 1,454 f.s.

Nature of mounting, field travelling, Mark I* (experimental).

Jump, + $24\frac{3}{4}$ minutes.

Remaining velocity.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Angle of descent.	Elevation.	Range.	Fuze scale for fuze and percussion time. No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
	Range.	Vertically or laterally.						Length.	Breadth.	Height.	
f.s.	yds.	yds.	° ′	° ′	° ′	yds.		yds.	yds.	yds.	secs.
1418	50	0·14	...	0 16	−0 16	100	$\frac{1}{4}$	...	...	...	0·23
1382	50	0·29	...	0 32	−0 6	200	$\frac{1}{2}$	...	...	...	0·47
1347	49	0·43	0 1	0 48	0 4	300	1	...	...	...	0·71
1312	48	0·58	0 1	1 5	0 14	400	$1\frac{1}{4}$	...	...	...	0·96
1278	47	0·72	0 1	1 22	0 24	500	$1\frac{1}{2}$	...	...	...	1·21
1244	46	0·87	0 1	1 39	0 34	600	$2\frac{1}{4}$	24·0	0·54	0·7	1·46
1212	45	1·01	0 2	1 57	0 44	700	$2\frac{1}{2}$	24·5	0·55	0·8	1·72
1180	44	1·16	0 2	2 15	0 55	800	3	25·0	0·56	0·9	1·98
1150	43	1·31	0 2	2 33	1 6	900	$3\frac{1}{4}$	25·5	0·57	1·1	2·25
1120	42	1·45	0 3	2 52	1 17	1000	$3\frac{1}{2}$	26·0	0·58	1·3	2·52
1092	41	1·60	0 3	3 11	1 28	1100	$4\frac{1}{4}$	26·6	0·60	1·5	2·80
1064	40	1·74	0 3	3 31	1 40	1200	$4\frac{3}{4}$	27·2	0·62	1·7	3·08
1038	39	1·89	0 3	3 51	1 52	1300	$5\frac{1}{4}$	28·0	0·65	2·0	3·37
1013	38	2·03	0 4	4 11	2 5	1400	$5\frac{3}{4}$	28·8	0·68	2·2	3·66
989	37	2·18	0 4	4 32	2 18	1500	6	29·7	0·71	2·5	3·96
967	36	2·32	0 4	4 57	2 32	1600	$6\frac{1}{2}$	30·7	0·74	2·8	4·26
946	35	2·47	0 5	5 17	2 46	1700	7	31·8	0·78	3·1	4·57
926	34	2·61	0 5	5 40	3 1	1800	$7\frac{1}{2}$	33·0	0·82	3·4	4·88
908	33	2·76	0 5	6 3	3 16	1900	8	34·3	0·87	3·8	5·20
891	32	2·91	0 6	6 27	3 32	2000	$8\frac{1}{2}$	35·7	0·92	4·4	5·52
875	31	3·05	0 6	6 52	3 48	2100	9	37·3	0·97	4·9	5·85
860	30	3·20	0 6	7 17	4 4	2200	$9\frac{1}{2}$	39·0	1·02	5·3	6·19
846	29	3·34	0 7	7 43	4 21	2300	10	40·8	1·08	5·7	6·54
832	28	3·49	0 7	8 10	4 39	2400	$10\frac{3}{4}$	42·6	1·14	6·2	6·89
819	27	3·63	0 8	8 32	4 57	2500	$11\frac{1}{2}$	44·5	1·21	6·7	7·25
806	26	3·78	0 8	9 5	5 16	2600	$11\frac{3}{4}$	46·4	1·28	7·3	7·61
794	26	3·92	0 9	9 33	5 35	2700	$12\frac{1}{4}$	48·5	1·36	8·0	7·98
782	25	4·07	0 9	10 2	5 55	2800	13	50·7	1·44	8·9	8·35
771	25	4·21	0 10	10 31	6 15	2900	$13\frac{1}{2}$	53·1	1·53	10·0	8·73
760	24	4·36	0 10	11 0	6 36	3000	14	55·5	1·62	11·1	9·12
750	24	4·51	0 11	11 30	6 57	3100	$14\frac{1}{2}$	58·0	1·72	12·2	9·52
740	23	4·65	0 11	12 0	7 19	3200	15	60·6	1·82	13·4	9·92
731	23	4·80	0 11	12 31	7 41	3300	$15\frac{3}{4}$	63·3	1·92	14·6	10·33
722	22	4·94	0 12	13 2	8 3	3400	$16\frac{1}{4}$	66·0	2·02	15·9	10·74
713	22	5·09	0 13	13 34	8 26	3500	$16\frac{3}{4}$	68·9	2·13	17·2	11·16
715	21	5·23	0 13	14 6	8 49	3600	$17\frac{1}{2}$	71·8	2·24	18·7	11·59
707	21	5·38	0 14	14 38	9 13	3700	18	74·9	2·35	20·2	12·03
699	20	5·52	0 14	15 10	9 37	3800	...	78·0	2·46	21·8	12·47
691	20	5·67	0 15	15 42	10 2	3900	...	81·2	2·58	23·5	12·92
683	19	5·81	0 16	16 15	10 28	4000	...	84·4	2·70	25·3	13·38
675	19	5·96	0 16	16 47	10 54	4100	...	87·7	2·83	27·2	13·84
667	18	6·11	0 17	17 20	11 21	4200	...	91·0	2·96	29·3	14·31
659	18	6·25	0 17	17 53	11 49	4300	...	94·4	3·10	31·5	14·78
651	17	6·40	0 18	18 26	12 17	4400	...	97·9	3·24	33·7	15·26
643	17	6·54	0 19	18 59	12 46	4500	...	101·5	3·38	36·1	15·76
635	16	6·69	0 20	19 32	13 16	4600	...	105·1	3·52	38·8	16·26
627	16	6·83	0 20	20 5	13 47	4700	...	108·8	3·67	41·7	16·78
619	15	6·98	0 21	20 39	14 18	4800	...	112·6	3·82	44·9	17·30
612	15	7·13	0 22	21 12	14 50	4900	...	116·5	3·97	48·3	17·84
605	15	7·27	0 23	21 46	15 23	5000	...	120·4	4·12	52·4	18·38

Range Table for 12-pr. B.L. Gun, Mark IV.

Based on Practice of 29.3.00.

Dated 2.5.1900

Charge, { weight, 12 1/4 oz. / gravimetric density, 90·05 / 0·307 / nature, cordite, size 5.

Projectile, { nature, shrapnel shell, Mark V. / weight, 12½ lb.

Muzzle velocity, 1,585 f.s.

Nature of mounting, travelling, field, Mark I* or II.

Jump, + 40 minutes.

Remaining velocity.	Angle of descent.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Elevation.	Range.	Fuze scale for fuze, time and percussion, No. 56, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
		Range.	Vertically or laterally.					Length.	Breadth.	Height.	
f.s.	° ′	yds.	yds.	mins.	° ′	yds.		yds.	yds.	yds.	secs.
1518	0 10	63	0·14	...	− 0 32	100	¼	...	...	...	0·20
1457	0 20	62	0·29	...	− 0 24	200	½	...	...	...	0·41
1401	0 30	61	0·43	1	− 0 16	300	¾	...	...	...	0·62
1351	0 41	60	0·58	1	− 0 8	400	1	...	...	...	0·84
1307	0 52	59	0·72	1	0 0	500	1½	20·0	0·25	0·3	1·07
1268	1 4	58	0·87	1	0 8	600	2	20·5	0·30	0·4	1·30
1234	1 16	56	1·01	2	0 16	700	2½	21·0	0·37	0·4	1·54
1203	1 29	54	1·16	2	0 25	800	2¾	21·5	0·45	0·5	1·79
1175	1 43	52	1·31	2	0 34	900	3	22·0	0·52	0·6	2·04
1149	1 57	50	1·45	3	0 44	1000	3½	22·5	0·60	0·7	2·30
1124	2 11	48	1·60	3	0 54	1100	4	23·0	0·67	0·8	2·56
1100	2 26	46	1·74	3	1 4	1200	4½	23·5	0·75	1·0	2·83
1077	2 41	44	1·89	3	1 15	1300	4¾	24·0	0·82	1·1	3·11
1056	2 57	42	2·03	4	1 27	1400	5¼	24·6	0·90	1·2	3·39
1036	3 13	40	2·18	4	1 39	1500	5½	25·2	0·97	1·4	3·68
1017	3 30	39	2·32	4	1 51	1600	6	25·8	1·05	1·6	3·98
999	3 48	38	2·47	5	2 4	1700	6½	26·4	1·12	1·8	4·28
982	4 6	37	2·61	5	2 17	1800	7	27·1	1·20	2·0	4·59
966	4 25	36	2·76	5	2 31	1900	7½	27·8	1·27	2·2	4·90
951	4 44	35	2·91	6	2 45	2000	8	28·6	1·35	2·4	5·21
937	5 4	34	3·05	6	2 59	2100	8½	29·4	1·42	2·7	5·52
923	5 25	33	3·20	6	3 14	2200	9	30·3	1·50	3·0	5·84
910	5 46	32	3·34	7	3 29	2300	9½	31·2	1·58	3·3	6·17
897	6 8	31	3·49	7	3 45	2400	10	32·1	1·66	3·6	6·50
885	6 31	30	3·63	8	4 1	2500	10½	33·1	1·74	4·0	6·81
873	6 54	29	3·78	8	4 18	2600	11	34·2	1·83	4·4	7·18
862	7 18	29	3·92	9	4 35	2700	11½	35·4	1·92	4·8	7·53
851	7 42	28	4·07	9	4 52	2800	12	36·7	2·02	5·3	7·88
840	8 6	28	4·21	10	5 9	2900	12½	38·1	2·13	5·8	8·24
829	8 31	27	4·36	10	5 27	3000	13	39·5	2·24	6·3	8·60
818	8 56	27	4·51	11	5 45	3100	13½	41·1	2·37	6·9	8·97
808	9 22	26	4·65	11	6 4	3200	14	42·8	2·50	7·5	9·34
798	9 48	26	4·80	12	6 23	3300	14½	44·6	2·65	8·2	9·72
788	10 14	25	4·94	12	6 42	3400	15	46·4	2·81	8·9	10·10
778	10 42	25	5·09	13	7 2	3500	15½	48·4	2·99	9·6	10·49
768	11 7	25	5·23	13	7 22	3600	16	50·5	3·19	10·4	10·89
759	11 34	24	5·38	14	7 42	3700	16½	52·7	3·39	11·2	11·29
750	12 1	24	5·52	14	8 3	3800	17	55·0	3·60	12·0	11·70
742	12 29	23	5·67	15	8 25	3900	17½	57·5	3·83	12·9	12·12
734	12 57	23	5·81	16	8 47	4000	18	60·1	4·08	13·9	12·54
726	13 25	22	5·96	16	9 8	4100	...	62·9	4·34	15·0	12·97
718	13 54	22	6·11	17	9 32	4200	...	65·9	4·61	16·1	13·41
710	14 23	21	6·25	17	9 55	4300	...	69·1	4·90	17·2	13·86
702	14 52	21	6·40	18	10 19	4400	...	72·5	5·20	18·7	14·31
694	15 21	20	6·54	19	10 43	4500	...	76·1	5·53	20·2	14·77

RANGE TABLE FOR 12-PR. B.L. GUN, MARK IV—*continued.*

Remaining velocity.	Angle of descent.	5 minutes' elevation or deflection alters point of impact.		Deflection for drift (Telescopic sight).	Elevation.	Range.	Fuze scale for fuze, time and percussion, No. 80, Mark IV.	50 per cent. of rounds should fall in			Time of flight.
		Range.	Vertically or laterally.					Length.	Breadth.	Height.	
f.s.	° ′	yds.	yds.	′	° ′	yds.		yds.	yds.	yds.	secs.
686	15 51	20	6·69	20	11 8	4600	...	79·7	5·87	21·7	15 23
678	16 21	19	6·83	20	11 31	4700	...	83·5	6·23	23·4	15·70
671	16 51	19	6·98	21	12 1	4800	...	87·4	6·60	25·2	16·17
663	17 21	18	7·13	22	12 29	4900	...	91·6	7·00	27·0	16·65
656	17 52	18	7·27	23	12 58	5000	...	96·0	7·41	28·9	17·14
648	18 23	17	7·42	24	13 27	5100	...	100·6	7·83	31·0	17·64
641	18 54	17	7·56	25	13 57	5200	...	105·3	8·27	33·3	18·16
633	19 25	16	7·71	26	14 28	5300	...	110·1	8·73	35·7	18·70
626	19 57	16	7·85	27	15 0	5400	...	115·0	9·21	38·2	19·26
618	20 29	15	8·00	28	15 33	5500	...	120·1	9·72	41·3	19·83
611	21 1	15	8·14	29	16 6	5600	...	125·3	10·25	44·5	20·42
604	21 33	15	8·29	30	16 40	5700	...	130·6	10·82	47·9	21·03
597	22 5	14	8·43	31	17 14	5800	...	136·0	11·40	51·4	21·65
590	22 37	14	8·58	32	17 49	5900	...	141·5	12·02	55·1	22·27
584	23 10	14	8·73	33	18 24	6000	...	147·0	12·65	58·8	22·90

FUZE SCALE FOR 12-PR. B.L. GUN, MARKS I AND IV.

When using Fuze, T. and P., No. 60, Mark I.

Based on Practice of 21.3.02.

Published *June*, 1902.

Fuze, Time and Percussion, No. 60, Mark I.
Projectile, Shrapnel Shell, Mark V.
Charge, $12\frac{7}{16}$ ozs. Cordite, Size 5.

Range.	Fuze set.	Range.	Fuze set.	Range.	Fuze set.
yards.		yards.		yards.	
100	$\frac{1}{4}$	2100	$11\frac{1}{4}$	4100	$27\frac{1}{4}$
200	$\frac{3}{4}$	2200	12	4200	$28\frac{1}{4}$
300	$1\frac{1}{4}$	2300	$12\frac{3}{4}$	4300	$29\frac{1}{4}$
400	$1\frac{3}{4}$	2400	$13\frac{1}{4}$	4400	$30\frac{1}{4}$
500	$2\frac{1}{4}$	2500	14	4500	$31\frac{1}{4}$
600	$2\frac{3}{4}$	2600	$14\frac{3}{4}$	4600	$32\frac{1}{4}$
700	$3\frac{1}{4}$	2700	$15\frac{1}{4}$	4700	$33\frac{1}{4}$
800	$3\frac{3}{4}$	2800	16	4800	$34\frac{1}{4}$
900	$4\frac{1}{4}$	2900	$16\frac{3}{4}$	4900	$35\frac{1}{4}$
1000	5	3000	$17\frac{1}{2}$	5000	$36\frac{1}{4}$
1100	$5\frac{1}{4}$	3100	$18\frac{1}{4}$	5100	$37\frac{3}{4}$
1200	6	3200	$19\frac{1}{4}$	5200	$38\frac{3}{4}$
1300	$6\frac{1}{2}$	3300	20	5300	40
1400	7	3400	$20\frac{3}{4}$	5400	41
1500	$7\frac{3}{4}$	3500	$21\frac{3}{4}$	5500	42
1600	$8\frac{1}{4}$	3600	$22\frac{1}{2}$	5600	$43\frac{1}{4}$
1700	$8\frac{3}{4}$	3700	$23\frac{1}{2}$	5700	
1800	$9\frac{1}{2}$	3800	$24\frac{1}{4}$	5800	
1900	10	3900	$25\frac{1}{4}$	5900	
2000	$10\frac{3}{4}$	4000	$26\frac{1}{4}$	6000	

SECTION GUN DRILL.

12-pr. B.L. Guns, Marks I to IV.

ARRANGEMENT.

SECTION GUN DRILL.

Battery gun drill, which does not vary with the equipment, is given in "Field Artillery Training."

The following paragraphs give the duties of the detachments at the section commander's orders.

Single detachments should be accustomed to drill as if forming part of a section, and the instructor should therefore always use the orders given for the section commander.

Detachments, unless otherwise ordered, fall in "*Detachments Left.*"

On dismounted parades the limber is moved by **6**, **7**, **8** and **9**, **6** and **7** pushing in rear, **8** and **9** at the pole. After the gun is limbered up the detachment will at once form "*Detachments Left.*"

THE DETACHMENT.

Mounted.—As in "Field Artillery Training."

Dismounted.

The detachment consists of nine dismounted men, who fall in two deep, one pace between ranks, **1** on the right of the front rank.

To Tell Off.

Section Commander.	*No.* **1.**
....Section—Tell Off.	

At the order from the section commander—**1** numbers himself **1**; the right hand man of the rear rank **2**; the right hand man of the front rank **3**; the second man from the right of the rear rank **4**; his front rank man **5**; and so on.

As soon as they have numbered off, the section commander will order "Coverers and Reserve Numbers—Take Post, Double March." On this order the **7**'s will take post on the left of the first line wagons of their respective subdivisions, in line with the poles and two yards from them.

The **8**'s and **9**'s will take post at the second line wagon. **8**'s one yard from and in line with the axletree of the limber. **9**'s one yard from and in line with the axletree of the wagon body. **8** and **9** of the right subdivision on the right of the wagon, those of the left subdivision on the left.

If no wagons are present, **7**, **8** and **9** will take post six yards in rear of and covering their guns.

If first line wagons only are present, **8** and **9** will take post six yards in rear of and covering their wagons.

Detachments Left.

Active numbers formed as above. **1** two yards on the left of and in line with the point of the pole.

Detachments may also be formed as follows:—

Detachments Front. **4** will be a horse's length in front of the point of the pole.

Detachments Rear. **3** will be a horse's length in rear of the muzzle of the gun.

Change of Position of Detachments.

Left to Rear.

Section Commander.	*Nos.* 1.
....Section—Detachments Rear—Double March.	Left about wheel. Left wheel. Left wheel. Halt.

Left to Front.

Section Commander.	*Nos.* 1.
....Section—Detachments Front—Double March.	Right Incline—Forward. Halt.

Front to Rear.

Section Commander.	*Nos.* 1.
....Section—Detachments Rear—Double March.	Left about wheel. Left about wheel. Halt.

Rear to Front.

Section Commander.	*Nos.* 1.
....Section—Detachments Front—Double March.	Right incline—Forward. Left incline—Forward. Halt.

Rear to Left.

Section Commander.	*Nos.* 1.
....Section—Detachments Left—Double March.	Left incline—Forward. Halt.

Front to Left.

Section Commander.	*Nos.* 1.
....Section—Detachments Left—Double March.	Left wheel. Left wheel. Left about wheel. Halt.

To Form Detachments Rear in Action.

Section Commander.	*No.* 1.
....Section—Detachments Rear.	No..... Double March.

At the order from the section commander—1 doubles to his place, three yards in rear of the right gnn wheel, and gives the order "*Double March.*"

At the order from 1—The remainder double to their places on the left of 1 by the shortest way and halt.

To Take Post from Detachment Rear in Action.

Section Commander.	*No.* 1.
....Section—Take Post.	No..... Double March.

At the order from 1—The detachment double to their places.

To Move the Gun with Drag Ropes.

Section Commander.	*No.* 1.
....Section—With drag ropes, Prepare to Advance.	

At the order from the section commander—2 and 3 hook the drag ropes to the gun wheel washers, the two highest numbers go to the pole, and the remainder man the ropes.

To Move the Gun without Drag Ropes.

Section Commander.	*No.* 1.
....Section—Without drag ropes, Prepare to Advance.	

At the order from the section commander—2 and 3 push between the muzzle and wheels; 4 and 5 man the gun wheels; the two highest numbers go to the pole, and the remainder assist.

Mounted.

The position of the detachment is as follows:—

Active numbers and horse holders on their horses in the detachment, as detailed in "Field Artillery Training." 7 on his horse half a horse's length on the left of the lead driver of the first line wagon.

8's on the limber and 9's on the body of the second line wagon, 8 and 9 of the right subdivision on the right, those of the left subdivision on the left side.

At the order "Attention." The men on the wagon sit upright, holding the hand straps with their inward and the guard irons with their outward hands. When going over rough ground, they should slightly raise themselves to avoid being jolted.

At the order "Sit at Ease." They place the outward upon the inward hand and sit well back.

To Mount.

Section Commander.	*No.* 1.
....Section—Detachments—Prepare to mount—Mount.	

At the order "Detachments—Prepare to Mount" from the section commander—The men with horses proceed as detailed in "Cavalry Drill."

8's and 9's double to their places at the wagon. 8's in rear of the wagon limber with their outer hands on the guard iron and inner feet on the perch; 9's in front of the wagon body, facing the rear, with their outer hands on the guard iron and outer feet on the spokes.

At the order "Mount"—The men with horses proceed as detailed in "Cavalry Drill."

8's and **9**'s spring up on to their places, **8**'s turning round to the front by lifting their legs, feet together, outwards over the guard irons.

To Dismount.

Section Commander.	*No.* **1**.
.... Section—Detachments—Prepare to dismount—Dismount.	

At the order "Detachments—Prepare to Dismount from the section commander"—The mounted men proceed as laid down in "Cavalry Drill." **8**'s turn to their rear, throwing their legs over the guard irons, **9**'s stand up, keeping their outward hands on the guard irons.

At the order "Dismount"—The mounted men proceed as laid down in "Cavalry Drill." **8**'s and **9**'s jump off and take post as laid down above.

Before dismounting on the order "*Prepare for Action*," "*Action Front*," etc., the active numbers give their bridoon reins to the men detailed in "Field Artillery Training" to hold their respective horses, and, after dismounting, they leave their horses by the front. Similarly when mounting they go to their horses from the front.

Preparation for Action.

Mark I Gun.

Section Commander.	*No.* **1**.
.... Section—Prepare for Action.	

At the order from the section commander—The active numbers dismount (at mounted drill) and—

1 sees that the bore is clear and superintends the other men.

2 fills the tube pocket and examines the brake and shell pocket, and sees that the lanyard is in the pocket.

3 removes the breech cover* and straps it on the axle, examines the breech fittings, sees that the fuze key is in its pocket on the tensile stay, and examines the brake and shell pocket.

4 removes the cover of the telescopic sight bracket and straps it on the tensile stay, and examines the sights and elevating gear.

5 sees that the fuze keys are in their pockets and examines the limber boxes.

6 and **7** examine the boxes of first line wagon, **8** and **9** those of the second, and see that the fuze keys are in their pockets.

Each man resumes his place as soon as he has completed his duties.

The men detailed to examine the various ammunition boxes see that they are properly filled, that the fuzes are set at "$1\frac{3}{4}$," and that the beckets of the safety pins are looped over the nuts of the fuzes†; also that the lids open easily and the locks are in good order

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* In very sandy soil the battery commander may order the breech covers to be left on.

† Only when shell are carried fuzed. (*See* page 29.)

Any deficiencies in the limber or 1st line wagon boxes are filled up from the 2nd line of wagons under the direction of **1**.

When shell are carried fuzed, all covers will be removed from the cartridges at the same time that the shell are fuzed.

The lanyards of all keys should be attached to the leather loops inside their pockets.

Preparation for Action.

Mark II to IV Guns.

Section Commander.	*No.* **1**.
.... Section—Prepare for Action.	

At this order from the section commander—The active numbers dismount (at mounted drill) and--

1 sees that the bore is clear and superintends the other men.

2 removes the breech cover* and straps it to the stay on the right side, fills the tube pocket and examines the breech fittings, axletree box, brake and spade.

3 removes the cover of the telescopic sight bracket and straps it on the stay, examines the axletree box, brake and spade, and sees that the sights and elevating gear are in good working order, and that the lanyard is in its pocket.

4 takes the fuze key from the pocket on the stay and places the lanyard round his neck and the key in the breast of his jacket.

5 sees that the fuze keys are in the pockets on the limber and examines the limber boxes.

6 and **7** examine the boxes of the first line wagon, **8** and **9** those of the second, and see that the fuze keys are in their pockets.

Each man resumes his place as soon as he has completed his duties.

The men detailed to examine the various ammunition boxes see that they are properly filled, that the fuzes are set at "$1\frac{3}{4}$" ($1\frac{1}{2}$ with Mark IV guns), and that the beckets of the safety pins are looped over the nuts of the fuzes†; also that the lids open easily and the locks are in good order. Any deficiencies in the limber or 1st line wagon boxes are filled up from the 2nd line of wagons under the direction of **1**.

The lanyards of all keys should be attached to the leather loops inside their pockets.

DUTIES.

Mark I Gun.

1 commands, attends to the handspike, sees that the time fuzes have been set correctly during "*Battery Fire*," rams home and lays for direction. He will occasionally examine the fuzes during "Section Fire."

He is responsible for the entire service of his gun.

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* In very sandy soil the battery commander may order the breech covers to be left on.

† Only when shell are carried fuzed. (*See* page 29.)

Should a case arise in which it is desirable that **1** should lay, he will perform the duties of **4**, with the addition of "Commands and sees that the time fuzes have been set correctly." **4** performing **1**'s duties with the above exceptions.

He lays for direction by looking along the line given by the elevating screw, cam lever and muzzle, while standing at the end of the handspike, not by looking over the sights. When, however, great accuracy of line is of importance, the laying for direction will be done by **4**, in which case **1** will traverse according to **4**'s signals.

He only gives the words of command shown for him; he does not repeat the section commander's orders; his executive orders should be no louder than is necessary for his subdivision to hear.

2 attends to the brake, axletree box and vent, fires and mans the wheel.

He must take every opportunity, after coming into action, of filling up the axletree box, if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

He must stand clear of the layer when telescopic sights are used.

3 attends to the brake, axletree box, and breech, supplies himself with ammunition from the portable magazine, or, if one has not been brought up, from the axletree box, placing the cartridge under his left arm until he has loaded the shell; sets time fuzes during ranging, and resets them when a change of fuze has been ordered during "*Section Fire*," until a fresh portable magazine has been supplied, shows them to **1** during "*Battery Fire*," takes out safety pin or pins, loads, and mans the wheel. When the portable magazine is empty he will leave the lid open as a signal to **6** to bring up a fresh one.

He opens and closes the breech as follows:—

To Open the Breech.—He takes hold of the cam lever with his right hand, raises it to its full extent, draws it towards him as far as it will go, and folds it down, and then throws the breech open.

To Close the Breech.—He takes hold of the cam lever with his right hand, raises it to its full extent, and swings the breech-screw round until the carrier ring is flush against the breech of the gun. Still keeping the lever raised, he pushes the screw home, and then forces the lever from him as far as it will go and folds it down. If the breechscrew will not turn, he starts it back by lowering the cam lever slightly, then forces the lever from him as far as it will go, and folds it down.

He must take every opportunity, after coming into action, of filling up the axletree box if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

4 lays for elevation and lifts at the handspike in running up or back.

He must keep the gun layed for elevation whether loaded or not; he must remember to look over the sights after the loading is completed, to see that the gun has not been shifted. He must always *depress* last.

5 fills the portable magazines, removing the beckets of the safety pins from over the nuts of the fuzes, and sets fuzes after the ranging is completed.

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* Although Nos. **2** and **3** are thus responsible that the axletree boxes are kept filled, **1** should order **6** to bring up single rounds fuzed at 1¾ as opportunity offers, without interfering with the service of the gun in action.

At "*Cavalry Attack*," he will, alternately with **6**, supply single rounds of ammunition.

6 supplies **3** with ammunition in the portable magazines, and assists **5**.

At "*Cavalry Attack*," he will, alternately with **5**, supply single rounds of ammunition.

When firing at a moving target, he will supply **4** with single rounds, with fuze set as ordered.

As a general rule only one portable magazine should be at the gun at a time, so that, if change of fuze, &c., is ordered, it may be immediately carried out by **5** and **6**.

Note.—On no account should a fuze without a safety pin be placed in any ammunition box.

Marks II to IV Guns.

1 commands, attends to the handspike, sees that the time fuzes have been set correctly during "*Battery Fire*," rams home and lays for direction. He will occasionally examine the fuzes during "*Section Fire*."

He is responsible for the entire service of his gun.

Should a case arise in which it is advisable that **1** should lay, he will perform the duties of **3**, with the addition of "Commands, and sees that the time fuzes have been set correctly," **3** performing **1**'s duties with the above exceptions.

He lays for direction by looking along the line given by the elevating screw and muzzle, while standing at the end of the handspike, not by looking over the sights. When, however, great accuracy of line is of importance, the laying for direction will be done by **3**, in which case **1** will traverse according to **3**'s signals.

He only gives the words of command shown for him; he does not repeat the section commander's orders; his executive orders should be no louder than is necessary for his subdivision to hear.

2 attends to the spade, axletree box, breech fittings and brake, and mans the wheel if necessary.

He must take every opportunity, after coming into action, of filling up the axletree box, if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

He opens and closes the breech as follows:—

To open the breech.—He takes hold of the lever with his left hand and swings the breech screw open.

To close the breech.—He takes hold of the lever with his left hand and pushes it from him as far as it will go.

3 attends to the spade and axletree box, lays, fires, and mans the wheel if necessary.

He must keep the gun layed for elevation whether loaded or not; he must remember to look over the sights after the loading is completed, to see that the gun has not been shifted; he must always *depress* last.

He must take every opportunity, after coming into action, of filling up the axletree box if any rounds have been taken from it; this must be done without interrupting the service of the gun.*

4 supplies himself with ammunition from the carrier, or, if one has not been brought up from the axletree box, placing the cartridge

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* Although **2** and **3** are thus responsible that the axletree boxes are kept filled, **1** should order **6** to bring up single rounds, fuzed at 1¾ (or 1½) as opportunity offers, without interfering with the service of the gun in action.

under his left arm, sets time fuzes during ranging and when firing at a rapidly moving target, and re-sets them when a change of fuze has been ordered during "*Section Fire*," until a fresh carrier has been supplied, shows fuzes to **1** during "*Battery Fire*," takes out safety pin or pins, and loads.

5 withdraws carriers, removes beckets of safety pins from over the nuts of the fuzes and sets fuzes after the ranging is completed.

At "*Cavalry Attack*" he will, alternately with **6**, supply **4** with carriers of ammunition.

6 supplies **4** with carriers of ammunition, and assists **5** in his duties.

At "*Cavalry Attack*" he will, alternately with **5**, supply **4** with carriers.

When firing at a moving target, he will supply **4** with single rounds, with fuze set as ordered.

Note.—On no account should a fuze without a safety pin be placed in any ammunition box.

SIGNALS.

Nature.	By whom given.	Meaning.
Either hand raised above his head ..	Layer	My gun is layed.
Motion with the palm of either hand in the required direction, arm well back	Layer	Trail right, or left.
Drops his hand	Layer	Halt (traversing).

ACTION.

Section Commander.	*No.* **1.**
.... Section—Action Front.	No. .... Action Front.

At the order from **1**—

The active numbers dismount, **3** unkeys and, with **2**, lifts the trail; when the trail is clear of the hook, **3** orders "*Limber drive on.*"

2 and **3** carry the trail round half a circle to the left, **2** shifting round the trail eye to avoid walking backwards, and lower it to the ground.

4 and **5** man the wheels.

The limber moves as detailed in "Field Artillery Training."

MARK I GUN.

As soon as the trail has been lowered to the ground—

1 takes the telescopic sight from the limber, hands it to **4**, ships the handspike, lays for direction and points out the target to **4**.

2 puts on the brake, takes the lanyard out of the tube pocket and holds it with the hook in his left hand, the extractor in his right.

3 puts on the brake and opens the breech.

4 sets his sight as ordered, and lays for elevation. As soon as the gun (if loaded) is layed he holds up his hand.

5 fills the portable magazines with shrapnel, removing the beckets of the safety pins from over the nuts of the fuzes; if "*Wagon Supply*" is ordered, he takes post 10 yards in rear of the gun until the arrival of the wagon.

6 assists **5**, and takes a portable magazine up to the gun as soon as one is ready, placing it near **3**, but clear of the recoil.

If "*Limber Supply*" is ordered, **5** and **6** unhook the wheel horses.

The position of the detachment is as follows:—

1 one yard in rear of the trail eye.
2 and **3** close to and facing the breech.
4 on the right of the trail eye.
5 in rear of the limber on the right side.
6 in rear of the limber on the left side.

Marks II to IV Guns.

As soon as the trail has been lowered to the ground—

1 takes the telescopic sight from the limber, hands it to **3**, ships the handspike, places the rammer under his left arm, lays for direction, and points out the target to **3**.

2 lowers the spade, adjusts the brake, opens the breech and places a tube in the vent.

3 takes out the lanyard, sets his sight as ordered and lays. As soon as the gun (if loaded), is layed he holds up his hand.

4 takes a carrier of ammunition from the gun limber, places it on the right side in line with the trail handle clear of the wheel and supplies himself with a round of ammunition from it.

5 opens the ammunition box, withdraws a carrier, removes the beckets of the safety pins from over the nuts of the fuzes.

6 assists **5**.

If "*Limber Supply*" is ordered, **5** and **6** unhook the wheel horses.

If "*Wagon Supply*" is ordered, **5** and **6** take post 10 yards in rear of the gun until the arrival of the wagon.

The position of the detachment is as follows:—

1 one yard in rear of the trail eye.
2 close to the breech on the right side.
3 close to the breech on the left side.
4 in line with the trail handle on the right side.
5 in rear of the limber on the left side.
6 in rear of the limber on the right side.
All the men face the front.

Action Right, Left and Rear are the same except that at—

Action Right.—The trail is carried round a quarter of a circle only.

Action Left.—The trail is carried round a quarter of a circle to the right, **3** in this case shifting round the trail eye.

Action Rear.—The trail is not carried round.

The limber in all cases moves as detailed in "Field Artillery Training."

In all cases on coming into action the brake blocks are to be brought close to the tires of the wheels to relieve the strain upon the rods when firing.

If the toggle brake is used as a firing brake the blocks should not be screwed up tight against the wheels, sufficient play should be allowed for traversing the gun, the toggle action will bring the brake into bearing when the gun is fired.

To Load.

At drill, rounds will not be loaded, but service shell, fuzed with drill fuzes, will be placed in succession as they are used on the ground well clear of the gun. The end of the handspike or rammer will be placed against the base of the hood in the action of "ramming home." Rounds will be returned to their proper place at the conclusion of the series on the order "Replace ammunition."

Section Commander.	*No. 1.*
....Section { Ranging Section / *or* / Fuze .... Load.	No. .... { Percussion Load / *or* / Fuze .... Load.

Mark I Gun.

At the order from **1**—

2 takes the lanyard from round his neck and holds it ready, the hook in his left hand, the extractor in his right.

3 sets the time fuze (when ranging), shows it to **1**, takes out the safety pin or pins and places the shell in the bore.

As soon as he sees that **3** *is ready to load*—

1 unships the handspike, takes a pace to the front with his left foot, and placing the unshod end against the shell, rams it gently home; then *keeping the handspike against the shell*, he applies his whole force to ensure its being true home.* He then steps back and replaces the handspike in the socket.

As soon as the shell has been rammed home—

3 places the cartridge in the chamber, closes the breech and holds up the cam lever, whilst **2** inserts a tube.

Marks II–IV Guns.

At the order from **1**—

4 sets the fuze (when ranging), shows it to **1**, takes out the safety pin or pins and places the shell in the bore.

As soon as he sees that **4** *is ready to load*—

1 steps in and rams the shell home;* he then steps back, placing the rammer under his left arm.

As soon as the shell has been rammed home—

4 places the cartridge in the chamber and supplies himself with a fresh round from the carrier, placing the cartridge under his left arm.

2 closes the breech.

3 hooks the lanyard to the tube. He should examine his sight after every round, to see that the elevation is correct.

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* In the event of a shell jamming in the bore during loading, a cartridge will be doubled up or cut shorter (by order of the section commander), and the shell blown out.

TO FIRE.

No gun is ever to be fired without an *order* from **1**, and **1** must never give this order until he sees that the gun is in all respects ready, and, except at "*Rapid Fire*," until he has received the order from the section commander.

MARK I GUN.

Section Commander.	*No.* **1.**
Fire No..... Gun.	No..... Fire.

At the order from the section commander—**1** steps clear of the recoil on the left side and gives the number of his gun as a caution.

At the caution from **1**—

2 hooks the lanyard to the tube, steps outside the wheel, and stands facing the gun, holding the lanyard with his right hand.

3 and **4*** step clear of the recoil.

As soon as he sees **2** ready and the other men clear, **1** gives the order, "*Fire.*"

At the order from **1**—**2** fires the gun by jerking the lanyard smartly; he then places the lanyard round his neck, the hook end hanging down on his left side, the extractor on his right.

Directly the gun stops in its recoil it is run up to its previous position without any order.

1 lifts at the handspike.

2 and **3** man the wheels.

As soon as the gun is run up—

1 lays for direction.

2 takes out the tube.

3 opens the breech and supplies himself with a fresh round of ammunition.

4 lays for elevation.

MARKS II–IV GUNS.

Section Commander.	*No.* **1.**
Fire No..... Gun.	No..... Fire.

At the order from the section commander—

1 steps clear of the recoil on the left side and gives the number of his gun as a caution.

At the caution from **1**—

2 and **3** step clear of the recoil, **3** holding the lanyard in his right hand. When using the telescopic sight, **3** must remove it before stepping clear.

1 then orders "*Fire.*"

3 fires the gun by jerking the lanyard smartly.

As soon as the gun stops in its recoil—

1 lays for direction.

2 opens the breech and inserts a new tube.

3 lays for elevation.

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* When using telescopic sights, 4 must remove the sight before stepping clear. Until new pattern sights are issued he must also do this with the tangent sight.

Miss-fire.

If there is a miss-fire*: after an interval of 10 seconds, the detachment resume their positions, the tube is extracted, by lowering the slide with Marks II to IV guns, a new one put in, and the gun is fired when ordered.

Rapid Fire.

Section Commander.	*No.* **1.**
.... Section—Fuze	No. .... Fuze .... Load.
.... Rounds Rapid Fire.	

1 gives the order to fire as soon as the gun is signalled ready, and continues to reload and fire until the specified number of rounds have been fired.

Cavalry Attack.

Section Commander.	*No.* **1.**
.... Section—Cavalry Attack.	No. .... Fuze $1\frac{3}{4}$ load (or $1\frac{1}{2}$ with Mark IV gun).

3 sets the sight at 1,000 yards, and lays for elevation over the sights.

1 gives the order to fire as soon as the gun is signalled ready, and continues to reload and fire without any further orders.

5 and **6** alternately supply **4** with carriers as required.

With the Mark I gun **4** lays for elevation by placing two fingers over the tangent sight, which is run down in the socket, laying over the top of his fingers and the acorn of the foresight.

Case.

Section Commander.	*No.* **1.**
.... Section—Case.	No. .... Case—Load.

This is exactly the same as "Cavalry Attack," substituting case for shrapnel fuze $1\frac{3}{4}$.

As soon as the last case in the limber or wagon has been supplied to **4** (or **3** with Mark I gun), the men at the limber or wagon set shrapnel fuzes at 0, and supply them in the same way as case.

To Stand Fast.

Section Commander.	*No.* **1.**
.... Section—Stand Fast.	

At the order from the section commander—

All stand fast, whatever they are doing, except that **3** (or **2** with Mark I gun) unhooks the lanyard, if it is hooked to the tube, and that if a safety pin has been taken out, **4** (or **3** with Mark I gun) places the shell in the bore.

At the order "*Go on*," the work is continued.

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* It is not a miss-fire if the wire breaks and the friction bar is *not* withdrawn.

Casualties.

The captain is responsible for the replacement of casualties as directed in "Field Artillery Training." Section commanders order such changes of duties in their sections and detachments as they consider necessary. If full detachments cannot be maintained, the duties are divided as follows:—

With five men.—**5** performs the duties of **5** and **6**.

With four men.—**2** performs the duties of **5** and **6**. With Mark I Gun, **4** performs the duties of **2** and **4**, with Marks II–IV Guns, **1** performs the duties of **2** in addition to his own.

With three men.—**1** loads and performs the duties of **2**; **2** performs the duties of **4**, **5**, and **6**, except loads; **3** no change. (**2**'s position should be behind the limber, setting fuzes, unless he has sufficient ready; in which case he should remain at the gun, withdraw safety pins, and hand shell to **1**.)

To Cease Firing.

Before giving the order to cease firing guns must be emptied.

Section Commander.	*No.* **1.**
.... Section—Cease Firing.	

Mark I Gun.

At the order from the section commander—

1 straps the handspike on the trail.

2 takes off the brake, puts the lanyard into the tube pocket and sees that the axletree box is properly shut.

3 takes off the brake and sees that the axletree box is properly shut.

4 places the telescopic sight (if it is in use) in its case, and returns the case to the box on the limber.

5 and **6** strap the portable magazines in their places without removing any ammunition that may be in them.

With the Mark I* carriage the left tangent sight should not be run down in its socket, but clamped at 1,500 yards.

Marks II–IV Guns.

At the order from the section commander—

1 secures the handspike and the rammer on the trail.

2 assists **3** to raise the spade, and secures it, sees that the axletree box is properly shut and adjusts the brake.

3 assists **2** to raise the spade, and secures it if the keep pin is on the left side, replaces the lanyard, lowers his sight, and replace the telescopic sight in the limber.

5 and **6** replace unexpended ammunition and carriers, and close the ammunition boxes, but will not delay the limbering up by resetting fuzes at $1\frac{3}{4}$ (or $1\frac{1}{2}$ with Mark IV gun); this however should be done at the earliest opportunity.

In cases where a safety pin has been taken out before the order "*Cease Firing*" is given, the loading will be completed and the gun fired as if it had been loaded when the order was given.

TO LIMBER UP.

Section Commander.	*No.* **1.**
.... Section—Front Limber Up.	

At the order from the section commander—

2 and **3** carry the trail round half a circle to the right, **2** shifting round the trail eye to avoid walking backwards, and lower it to the ground.

4 and **5** man the wheels.

As soon as the trail is lowered the detachment get under cover—

1 in front of **2**;
2 and **3** between breech and wheels;
4 and **5** between muzzle and wheels;
6 in front of **4**;

the whole with their backs to the axletree.

The limber comes up as detailed in "Field Artillery Training," and **1** orders "*Halt—Limber Up.*"

At the order from **1**—

2 and **3** lift the trail and place it on the hook.

3 keys up.

4 and **5** man the wheels.

On the completion of the above the detachment mount without further order.

Right, Left, and Rear Limber Up are the same except that at—

Right limber up.—The trail is carried round a quarter of a circle only.

Left limber up.—The trail is carried round a quarter of a circle to the left, **3** in this case shifting round the trail eye.

Rear limber up.—The trail is not carried round.

The limber in all cases moves as detailed in "Field Artillery Training."

MOUNTING AND DISMOUNTING.

This should only be practised at the annual course of military training, and then only sufficiently for instruction; every care must be taken that the equipment is not injured.

To Dismount the Gun and Carriage.

Section Commander.	*No.* **1.**
Dismount No. .... Gun and Carriage.	No. .... Prepare to Dismount the Gun. Dismount the Gun. Dismount the Carriage. Lift—lower.

At the order "Prepare to Dismount the Gun"—

1 removes the sights, disconnects the elevating gear, runs it down. He then mans the handspike.

2 and **3** unkey the capsquares (remove the breech fittings with Marks II–IV guns) and man the wheels.

4 and **5** double two drag ropes and make fast the bights with a reef knot, half over and half under the breech, just in front of the sight socket; the running ends are then passed outside the tire of the wheels on the same level as the breech, two turns taken round the felloe, one on each side of a spoke to prevent slipping, and made fast with a half hitch, blackwalling against the tire. **4** and **5** then man the wheels.

6 and **7** bring up the drag ropes to **4** and **5**, and man the wheels.

8 and **9** bring up a 6-ft. handspike, place it in the bore and man it.

At the order "Dismount the Gun"—

1 raises the trail off the ground until the trunnions are clear.

8 and **9** lift the gun clear of the trunnion holes (**2** and **3** moving the capsquares) while **2**, **4**, and **6**, **3**, **5**, and **7**, man the wheels forward until the gun is lowered to the ground.

At the order "Dismount the Carriage"—

2, **3**, **4**, and **5** go to the carriage, **2** and **3** in rear, **4** and **5** in front.

6, **7**, **8**, and **9** go to the wheels, **6** and **7** in front, **8** and **9** in rear.

8 and **9** take off the linch pins and washers.

At the order "Lift"—The carriage is lifted, and the wheels taken off.

At the order "Lower"—The wheels are placed on the ground dish down, and the carriage is lowered to the ground.

To Mount the Gun and Carriage.

Section Commander.	*No.* **1**.
Mount No. .... Gun and Carriage.	No. .... Mount the Carriage. Lift. Prepare to Mount the Gun. Mount the Gun.

This is exactly the opposite to the dismounting just described.

2 and **3** will not move the capsquares until the trunnions are about 6 inches from them.

Note.—Limbers and wagons are mounted and dismounted in a similar way, the poles having been previously removed.

DISABLED ORDNANCE.

Whenever operations are not described in detail or numbers are not told off to particular duties, **1** will order such duties to the several men as may be required.

To Replace a Damaged Wheel.

Should a gun wheel be disabled in action, it should be immediately turned so as to bring the sound portion on to the ground (the brake is put on with Mark II to IV guns), and notice should be sent to the captain.

The latter will immediately send up another wheel, which will be

brought alongside the damaged one, and the wheels changed as follows:—

Section Commander.	*No.* 1.
No..... Change Wheels.	No..... Change Wheels. Lift. Lower.

At the order "No..... Change Wheels" from 1—

6 brings up a 6-ft. handspike and hands it to 2, or 3 (according to side).

1 and 6 go to the damaged wheel, 1 in rear. 6 removes the linch pin and washer.

2, 3, 4, and 5 man the handspike, which is placed under the axletree by 2 or 3.

At the order "Lift"—

The axletree is lifted, and the damaged wheel is taken off. 6 rolls it out of the way, and the new wheel is put on by the numbers who brought it up.

At the order "Lower"—

The carriage is lowered, the linch pin and washer put on by 6, who also replaces the handspike, and all resume their duties in action.

The damaged wheel is either left on the ground or removed by the men who brought up the new one, as the captain may have directed.

To Remove a Gun and Carriage by a Limber.

The gun is dismounted, the horses taken out; the limber is run over the gun so that the breech is towards the pole, and the trunnions under the limber hook; the muzzle and pole are raised, and the gun slung with a drag rope round the trunnions to the limber hook; the end is passed to the front, and the muzzle borne down, a half-hitch taken round the breech, and made fast to the futchels.

The carriage is dismounted and turned over (projecting fittings, &c., being first removed). It is then lifted by all the numbers, trail first, up the front of the limber on to the top of the box, until the weight is balanced for draught.

The trail is secured by a drag rope to a handspike in the bore; the wheels are placed, dish down, on the top of the carriage, securely lashed with drag ropes to the futchels and limber hook in rear and to the draught hooks in front.

To Remove a Gun and Carriage by a Wagon.

The gun is slung to a limber as before. The carriage turned over (projecting fittings, &c., being first removed). It is then lifted by all the numbers on to the wagon body until the trail eye nearly touches the limber box; and is secured to the perch by a drag rope. The wheels are placed, dish down, on the top of the carriage, and lashed.

AIMING POSTS.

Aiming posts are issued in pairs of the same shape, the right guns of sections having those with square and the left those with circular heads. The Battery Commander's aiming posts have diamond shaped heads. Aiming posts should be painted with broad bands of black and white alternately all the way down.

LAYING BY MEANS OF ONE AIMING POST.

Section Commander.	*No.* 1.
.... Section—One Aiming Post.	

At the order from the section commander—

1, standing at the end of the handspike, directs **3** (**4** with Mark I. gun) by signal to plant his aiming post in line with the target.

2 and **3** mark on the ground the position of the wheels.

3 (**4** with Mark I. gun) doubles out about 50 yards to the front with one aiming post, which he plants as directed by **1**; he then doubles back and gets out his telescopic sight.

At "*Go on*," the firing is continued, the gun being layed for direction on the aiming post and for elevation by the clinometer on the telescopic sight.

When the target cannot be seen by **1** dismounted, the section commander will direct whether he should mount or stand up on the limber.

On "*Cease Firing*" the post is brought in by **3** (**4** with Mark I. gun) on the order "*In aiming posts.*"

LAYING BY MEANS OF TWO AIMING POSTS.

The procedure is as laid down in "Field Artillery Training." When coming into action with two aiming posts guns should, when the ground permits, be brought up on the left of the layer and come into "action front." The off gun wheel will be steadied by **5**, and the carriage made to pivot on this wheel, thus bringing the gun on to the line of fire marked by the aiming posts. Before the gun comes up **3** will replace his telescopic sight in its case, withdrawing it again as soon as the trail has been lowered to the ground.

On "*Cease Firing*" the aiming posts are brought in by **3** (**4** with Mark I gun), on the order "*In aiming posts.*"

THE FIELD PLOTTER.

DESCRIPTION.

The Field Plotter is an instrument designed for the mechanical solution of a triangle in which two sides and the included angle are known.

It consists of two similar bars, each having a semi-circle at one end. These bars slide on each other and can be clamped at any point. The semi-circles are graduated in degrees and the bars in hundreds of yards from 0 to 3,000. These graduations correspond to the distance between the centres of the semi-circles which is known

as the base. Pivotted to the centres of the semi-circles are two bars which are joined together by a movable double clamp. The bars are graduated in 100's of yards from 1,300 to 4,500.

INSTRUCTIONS FOR USE.

1. Slighten loosely all clamps.
2. Set the base to the distance from the battery B to the observer O.
3. Move the double clamp along the upper bar to the distance from O to the target T and clamp by upper screw.
4. Move the bar till the arrow mark is opposite the angle T O B on the arc, and clamp by the lower screw of double clamp. The angle T O B may be measured by means of the telescope and stand (*vide* instructions below).
5. Reverse the instrument and on the bar will be found the range B T, and on the semi-circle the angle T B O.

For longer bases than 3,000 or longer ranges than 4,500 the graduations may be taken as double yards, the angles remaining the same.

THE TELESCOPE, STAND AND DIRECTOR.

DESCRIPTION.

Telescope.—The telescope is of "two-draw" construction, having a field of 1° and a magnifying power of from 30 to 35. It is provided with a single sighting wire which can be used either vertically or horizontally (by turning the first draw of the telescope) as desired.

A small metal slide is screwed on to the stick of the telescope, so as to be under the centre of gravity, when the telescope is extended, and forms a means of attaching the telescope to the stand.

Stand.—The stand consists of a triped with round legs made of ash, surmounted by a metal head of circular form, the base of which is graduated from 0° to 180° right and left; a circular plate is free to revolve over the base plate, and has an arrow head engraved on it by means of which angles can be read or set off. A clamp is provided to fix the plate at any required angle. A plate of smaller diameter, formed of one piece with the pivot, and which can be fixed at will to the revolving plate (by means of a clamp), carries a clip or cradle into which the slide of the telescope fits, where it is retained by means of a flat spring.

The cradle is mounted on a knuckle joint which gives motion vertically.

For purposes of measuring angles of sight a small level (on the Abney principle) is fixed to the cradle of the stand.

The legs of the stand are jointed by means of ferrules and are so arranged that the stand can be used either with short or long legs as convenient.

To prevent undue splay, a light chain shackles the upper portions of the legs together.

A hook is provided underneath the pivot so that a weight may be suspended to steady the stand in rough weather.

Director.—A straight-edge sight is provided which fits into the cradle of the stand, in a similar manner to the telescope, and can be

used instead of the telescope for taking angles at short ranges. This sight is called the Director.

Arrangements for Transport.—For transport, the detachable portions of the legs are strapped outside the upper portion and the whole dropped into a leather bucket, which can be attached to the saddle on the off side.

A bucket is also provided to carry the telescope in a similar manner on the near side of the saddle.

Instructions for Use.

To set up the Telescope and Stand.—The stand is removed from the bucket and, if it is to be used by a man standing, the lengthening portions of the legs are fixed on. In a high wind it is recommended that the short legs be used.

To take angles conveniently, arrange the tripod so that the zero point is under the view of the observer.

Extend the telescope and slip the slide into the cradle till the spring catches.

To Focus the Telescope.—The telescope should now be directed on to a *distant* object, and the observer should push in the first draw tube by a slow rotary motion until he sees the object viewed, as distinctly as possible.

Horizontal Angles.—To measure horizontal angles between objects, the telescope or director can be used according to circumstances, the procedure being the same.

When the telescope is used, turn the first draw tube until the sighting line in the telescope is vertical.

The revolving plate bearing the arrow head is clamped at zero by the outer clamp. The inner clamp is loosened, and the telescope directed on to one of the objects, so that the sighting line cuts the object. The inner clamp is now tightened up, taking care that the telescope does not move off the object.

The outer clamp is then loosened, and the telescope can be swung round on to the other object, the angle being read off on the graduated arc to the nearest degree.

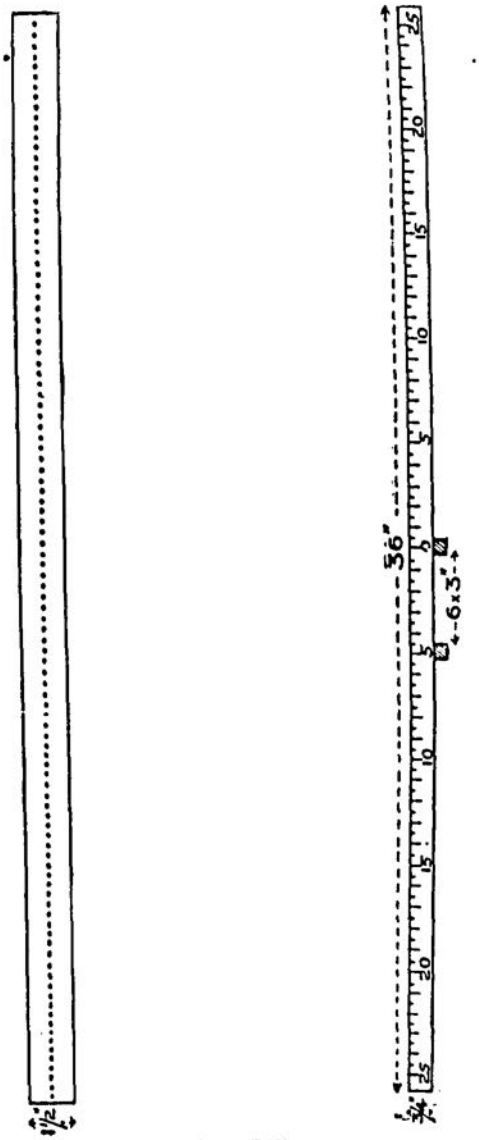
Vertical Angles or Angles of Sight.—Angles of sight can only be read approximately. The level is set parallel to the telescope axis when it is reading zero.

To measure an angle of sight turn the first draw tube of the telescope till the sighting line cuts the object of which the angle of sight is required.

By means of the thumb screw of the level bring the bubble to the centre of its run and the angle on the small arc, read to the nearest degree, will be the angle of sight required.

THE WOODEN ARC FOR GIVING DEFLECTION.

This consists of a board (dimensions given below), having two projections underneath to fit into the foresight recesses. It is graduated on its rear face in half degrees from 0° to 25° right and left, a small hole in the top corresponding to each graduation.



Mark I Gun.

INSTRUCTIONS FOR USE.

The arc is placed in position over the foresight recesses, a small pin is placed in the hole on the top corresponding to the number of degrees of deflection ordered, the pin being moved to the *left* for right deflection and to the *right* for left deflection. The tangent sight is set at zero and the gun layed, using the pin on the arc as a foresight.

Thus, if 25° right is ordered, place the pin in the 25° hole on left side and traverse the gun until the line of sight passing through the notch on the tangent sight and the pin on the arc is in line with the aiming posts or passes through the aiming point or auxiliary mark.

To lay out a line of fire at any required angle up to 25° *from a given line.*—The pin is placed in the arc at the angle ordered right or left (according as the angle required is left or right of the given line), and the gun is layed on the given line. The arc is then removed, the foresight replaced and, without moving the gun, two aiming posts are planted in the line given by the tangent sight and foresight; these mark the required line of fire.

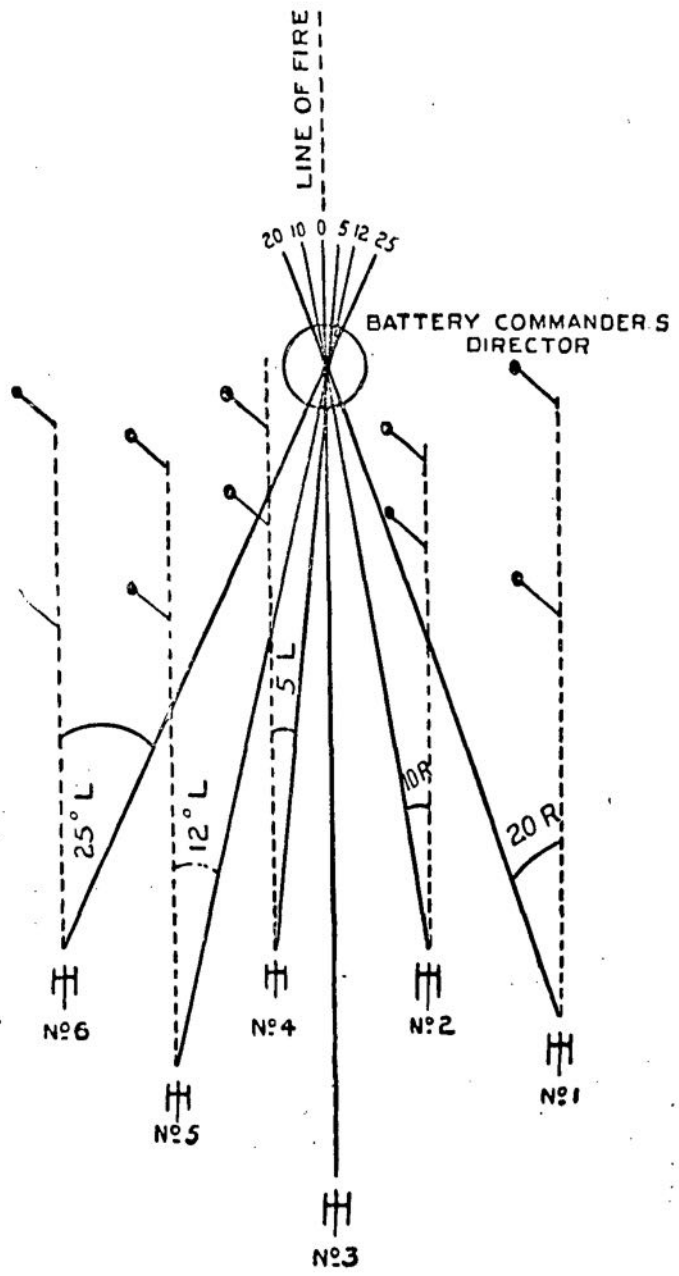
The arcs for Marks II to IV guns are similar to the above but, instead of the projections underneath, they have a hole in them which fits over the foresight.

N.B.—These wooden arcs are provided as a temporary expedient pending the introduction of sights capable of giving large angles of deflection.

To Lay Out the Line of Fire without Laying Cords, Using Wooden Gun Arcs and Director.

1. When a distant object is available as an auxiliary mark.

The battery commander plants his director in the line of fire, and measures the angle to the auxiliary mark.



The battery is then brought into action. The battery commander orders all gun arcs to be set at this angle and the guns layed on the auxiliary mark. The sights are then set at zero and two aiming posts planted for each gun.

2. When no distant object is available as an auxiliary mark.

The battery commander goes to some convenient point, near the position occupied by the battery, and lays his director, set at 180°, in the line of fire (*vide* Fig. 2).

He then orders each gun to lay, with its sights at zero, on the centre of the director.

He aligns the sights of the director on the centre of the muzzle of each gun in turn and orders deflection (right or left as the case may be) to each gun as indicated by the arc of the director.

Thus No. 1 gun bears 20° right.

Battery commander orders "*No.* 1 *gun* 20° *right deflection.*"

No. 2 gun bears 10° right.

Battery commander orders "*No.* 2 *gun* 10° *right deflection.*"

No. 3 gun bears zero and gets no order.

No. 4 gun bears 5° left.

Battery commander orders "*No.* 4 *gun* 5° *left deflection.*"

No. 5 gun bears 12° left.

No. 5 *gun* 12° *left*, and so on.

Each gun gives the deflection ordered and plants two aiming posts in the line thus obtained; these mark the respective lines of fire.

SIGNALLING BETWEEN BATTERIES AND OBSERVING PARTIES.

The following should be read in conjunction with "Field Artillery Training," Chapter IV :—

The following system of signalling between a battery and its observing party is based on the assumptions (1) that an establishment of at least four signallers will be maintained in future by each battery of Horse and Field Artillery, and (2) that it is advisable to introduce no more new codes or signals than are absolutely necessary.

Trained signallers are likely to be confused if they are required to depart from the authorised methods to which they are accustomed.

Signalling from an observing station will be greatly complicated when more than one group of signallers are posted there. It is conceivable that the observing station selected may be occupied by parties from more than one brigade division and even by signallers from the other arms. Confusion is certain to arise unless a carefully devised system be employed.

Two signallers are required for each party, but should it be necessary, owing to distance, to read through glasses, a third man must be added. The latter need not be a trained signaller, but most probably every battery will have at least two supernumeraries or men under instruction. It is assumed that every trained man is acquainted with both Morse and semaphore codes.

The signallers take up such positions as will endure cover from view of the enemy, an uninterrupted view of the other party and a good background, so far as possible. Both parties will direct each other which flags to use, and (within a small limit) where to place

themselves as laid down in "Signalling Instructions," and the battery signaller must be in a position which is convenient to the battery commander.

When the observing station is nearly in the line of fire of the battery, the observing officer should signal down to the battery, whether the line of fire is to the right or left of the observing station from the battery commander's point of view.

All messages, ranges and angles should be written down, if possible, and handed at once to the battery commander or observing officer. Observations of shots may be called out by the reader as they are made, if the battery commander does not read them himself.

The result of each ranging round will be signalled by the code in "Field Artillery Training."

Each battery will have its own "call," and should there be more than one group of signallers in the vicinity, each signal must be preceded by the battery call.

For signalling ranges and angles the "Clock code"—*i.e.*, A=1, B=2, C=3, &c., &c., should be employed.

Example.—Let T be the target, O the observing station, and B the battery. Call O.S. the observer's signallers and B.S. the battery signallers.

The abbreviation for Range (O T) will be R G.
" " " Angle (B O T) will be A.
" " " Base (O B) will be B.

The procedure would be as follows:—

Let the "battery call" be P K.

The observing officer finds the range O T to be 3,720 yards, the angle B O T to be 71°, and the base O B to be 580 yards.

Then O.S. sends P K, P K, P K until—
B.S. replies P K.
O.S. sends B.
B.S. Replies T (general answer).
O.S. sends E H K (clock code for 580).
B.S. replies E H K.
O.S. sends R G.
B.S. replies T (general answer).
O.S. sends C G B K (clock code for 3720).
B.S. replies C G B K.
O.S. sends A.
B.S. replies T (general answer).
O.S. sends G.A. (clock code for 71).
B.S. replies G.A.
O.S. sends V E (end of message).

If any group of numerals is wrongly collated, O.S. sends the "erase" and repeats the figures until B.S. codes them back correctly.

METHOD OF DRILLING RECRUITS.

General Remarks.

Many good recruits are acquainted only with the commonest English words, and, as their duties and the material they have to use are altogether new and strange, instructors should be careful—

To use the simplest language possible.

To explain, as they occur, all technical terms.

To illustrate descriptions by means of a piece of chalk, or otherwise, and in all cases to render clear the object of the various duties.

Not to attempt to teach recruits elaborate descriptions, exact measurements, &c., which they do not understand.

To avoid needless repetitions, or wearying the men by keeping them for a long time at one thing; the drill should be varied by short descriptions (avoiding manufacturing details), setting fuzes, &c.

To bring men forward by successive steps, by explaining a position and then doing it; for instance, when commencing recruits' gun drill, the instructor should himself show how a duty should be performed, and then cause every man in turn to do that duty (make every man do **1**'s duty, then every man **2**'s, then **4**'s and so on). When each man knows the duties of each post separately, the men who work and move together should be instructed after the manner described below, before commencing gun drill in quick time.

Great patience is necessary on the part of the instructor. He must make allowance for the different capacities of the recruits, and squads should periodically be arranged so that the intelligent soldier may reap the advantage of his work, and not be kept back by those of inferior ability. Recruits as they progress should be called out in turn to drill, for this gives a man confidence, helps him to learn, and causes him to take an additional interest in his work.

The instructor should place himself where he can be seen and heard by all in the squad; should stand in a smart soldierlike attitude, and should avoid pacing up and down, looking down on the ground, turning his back on the squad, and similar habits, which have the effect of fidgeting the men and distracting their attention.

His explanation should be given in a distinct voice; his word of command should be sharp and decisive.

Stress is laid on the above points, because men unconsciously imitate their instructors. A first-rate instructor will make a good detachment; his manner and style are therefore of the first importance.

The utmost alertness of attitude and smartness of movement should be enforced throughout gun drill.

The instructor can at any time ascertain that each man is at his post, by proving. This he does by calling out "*Prove your numbers* —**1**, **2**, *&c.*," when the men named will prove in succession, as detailed in "Cavalry Drill."

If at any time the instructor wishes to change the numbers, he gives the order—"*Change Rounds.*" On this, **1** becomes **9**; **9**, **8**; **8**, **7**; **7**, **6**; **6**, **5**; **5**, **4**; **4**, **3**; **3**, **2**; **2**, **1**.

LIST OF STORES.

Carriage.

Description.	Mark I*.	Mark II.	Where carried.
Bit, vent, 14-inch	1[a]	—	In fuze key pocket.
	—	1	On top of trail.
Boxes { cartridge	—	2	Component of axletree box.
Boxes { ⊤ friction tubes	1	—	On top of trail.
Brushes, breech screw	1	—	In upper trail box.
	—	1	In pocket brake arm, right side.
Buckets, water, G.S., leather ..	2	2	Under carriage.
Can, lubricating, No. 9	1	—	In lower trail box.
	—	1	In leather case, on right side.
Caps, sponge, No. 6..	2	2	On cleaners.
Cap, spring case	1[b]	1[b]	On rear spring case.
Cartridges, cordite, 12 1/16 ozs., size 5	4	4	Two in each axletree box.
Case, can lubricating, No. 9b ..	—	1	On right side.
Cleaners, { pisaaba	1	—	On tensile stay, left side.
	—	1	On brake arm, right side.
Cleaners, { wool	1	—	On tensile stay, right side.
	—	1	„ „ left „
Covers, { breech	1	1	On gun.
Covers, { cartridge	4	—	On cartridges.
Covers, { muzzle, No. 1	1	1	On gun.
Covers, { telescopic sight bracket	1	1	On sight bracket.
Cutter, wire {	1	1	In pocket (b) on brake arm, right side.
Cutter, wire { springs (spare) ..	2	2	
Cutter, wire { cutters „ ..	4	4	
Hammer, claw, 20-oz.	1	—	In upper trail box.
	—	1	On left side.
Handspike, traversing, No. 2 { Mark II..	1[b]	—	On top of trail, right side.
Handspike, traversing, No. 2 { Mark III	—	1[b]	
Keys, fuze, universal	1	1	In fuze key pocket.
Lanyards, friction tube, ⊤.. ..	2	—	1 in pocket on shaft of brake gear and 1 in right axletree box.
	—	2	1 in tube pocket on right side, and 1 in right axletree box.
Oil, Rangoon .. .. pints	½	½	In No. 9 lubricating can.
Pincers, carpenters' .. pairs	1	—	In upper trail box.
	—	1	On left side.
Pockets, { breech brush	—	1	On right brake arm.
Pockets, { key, fuze, universal ..	1[b]	—	On left tensile stay.
	—	1	On left brake arm.
Pockets, { lanyard	1[b]	—	On right brake shaft.
Pockets, { ⊤ tubes	—	1[b]	On right brake arm.
Posts, aiming	2	2	On left side.
Rammer	—	1	On top of trail, left side.
Rimer, vent, ⊤	1	1	In fuze key pocket.
Shell, shrapnel, B.L., 12-pr. ..	2	2	In left axletree box.
Shot, case	2	2	In right „
Spanner, McMahon, 15-inch ..	1[c]	—	In upper trail box.
	—	1[c]	On right side.

[a] 11-inch to be retained until unserviceable.
[b] Issued with the carriage.
[c] Per section, in "A," "C," and "E" subdivisions.

LIMBERS.

Carriage and Ammunition Wagon.

Description.	Carriage. Mark I*.	Carriage. Mark II.	Wagon. Mark I*.	Wagon. Mark II.	Where carried.
Axes, felling, curved helve	1	1	—	—	Under footboard.
Axes, pick { heads, 6½-lb.	1	1	1	1	} „ limber.
Axes, pick { helves, 34½-ins.	1	1	1	1	} „ limber.
Bags, kit	—	—	2	2	On top of box.
Bars, supporting draught pole, No. 2 (spare)	1[a]	1[a]	—	—	On platform board.
Blankets, G.S.	2	2	2	2	On top of box.
Blocks for T tubes	1	—	1	—	}
Boxes, cartridge	—	9	—	9	}
Boxes, fuze, No. 20	2[b]	—	2[b]	—	} In ammunition box.
Boxes, fuze, „ 21	1[b]	—	1[b]	—	} In ammunition box.
Boxes, fuze, „ 28	1[b]	—	1[b]	—	} In ammunition box.
Boxes, fuze, „ 31	—	3[b]	—	3[b]	In ammunition box.
Boxes, grease, 3-lb.	1[b]	1[b]	1[b]	1[b]	Rear of axletree.
Boxes, obturating pads	1	—	1	—	In ammunition box.
Boxes, obturator, steep coned, B.L., 12 or 15-pr.	—	1	—	1	In lower tray of ammunition box.
Boxes, telescopic sight	1[b]	1[b]	1[b]	1[b]	On platform board, "near" side.
Boxes, T tubes	—	2[b]	—	2[b]	In ammunition box.
Brushes, water carriage	1	—	1	—	On futchel, "near" side.
Brushes, water carriage	—	1	—	1	Under footboard, "near" side.
Buckets, water, G.S.	2	2	2	2	Under limber.
Can, lubricating, No. 3	1[b]	1[b]	1[b]	1[b]	In case, can, lubricating, No. 3.
Cartouches	2	—	2	—	} In ammunition box.
Cartridges, cordite, 12 7/16-ozs., size 5	44	—	44	—	} In ammunition box.
Cartridges, cordite, 12 7/16-ozs., size 5	—	36	—	36	In 9 tin cartridge boxes.
Cases, can, lubricating, No. 3	1[b]	1[b]	1[b]	1[b]	Rear of axletree.

Carriers, case shot	—	1[b]	—	1[b]	In ammunition box.
Carriers, shrapnel shell	—	8[b]	—	8[b]	In ammunition box.
Clamps, tangent sight	2	—	2	—	One in "off" and one in "near" holdall.
Clamps, tangent sight (spare)	—	—	1[c]	—	In "near" holdall.
Cloaks	—	—	2	2	On top of box.
Cloths, sponge	5	—	5	—	As convenient.
Cloths, sponge	—	5	—	5	In lower tray of ammunition box.
Covers, cartridge	44	—	44	—	On cartridges.
Discs, adjusting, obturator (spare)	—	1	—	1	In box, obturator, steep coned.
Discs, pad, obturating, adjusting („)	1	—	1	—	In box, obturating pad.
Discs, pad, obturating, protecting, sets („)	1	—	1	—	In box, obturating pad.
Driver, screw, G.S., 4-inch	1	—	1	—	In "off" holdall.
Driver, screw, G.S., 4-inch	—	1	—	1	In upper tray.
Fuzes, T and P	46	36	46	36	In fuze boxes.
Grease, lubricating lb.	3	3	3	3	In grease box.
Hames, pairs (spare)	1[c]	1[c]	—	—	On platform board.
Handspike, traversing, No. 2 Mark II („)	—	—	1[c]	—	On footboard.
Hooks, bill	1	1	1	1	Under "off" side.
Kettles, camp, oval, 12 qts.	1[d]	1[d]	1[d]	1[d]	„ "near" „
Keys, fuze, universal	2[e]	2[e]	2[e]	2[e]	One in each pocket, rear of limber.
Keys, lock	2	—	2	—	In pocket, rear of limber.
Lanyard, friction tube, T	—	—	2	—	In "near" holdall.
Lanyard, friction tube, T	—	—	—	2	In upper tray, ammunition box.
Lever, cam	—	—	1[c]	—	In ammunition box.
Magazines, portable	2	—	2	—	Rear of limber.
Obturator; pad with front and rear protecting discs (spare)	—	1	—	1	In box obturator, steep coned.
Oil, Rangoon pints	1	1	1	1	In No. 3 lubricating can.
Pad, obturating (spare)	1	—	1	—	In ammunition box.

[a] Per section, "B," "D," and "F" subdivisions.
[b] Issued with limber.
[c] Per section "A," "C," and "E" subdivisions.
[d] As required.
[e] When the guns are parked, the fuze keys should be carried in the ammunition boxes, on all other occasions they should be carried in the pockets.

CARRIAGE AND AMMUNITION WAGON.

Description.	Carriage. Mark I*.	Carriage. Mark II.	Wagon. Mark I*.	Wagon. Mark II.	Where carried.
Pins, keep, split, 2 inches × ·192 inch (spare)	—	6	—	—	In tin box, upper tray of ammunition box.
Pins, keep, split, ·7 " × ·08 " (")	—	6	—	—	In tin box, upper tray of ammunition box.
Pins, keep, split, ·35 " × ·06 " (")	—	6	—	—	In tin box, upper tray of ammunition box.
Pins, elevating bolt (")	—	6	—	—	In tin box, upper tray of ammunition box.
Pins, linch, 2nd Class (")	1[a]	—	1[a]	—	In "off" holdall.
Pins, linch, 2nd Class (")	—	1[a]	—	1[a]	In lower tray of ammunition box.
Pins, pole No. 17–18 pole with key and chain (")	1[a]	—	—	—	In "near" ammunition box.
Pins, pole No. 17–18 pole with key and chain (")	—	1[a]	—	—	In lower tray of ammunition box.
Rimers, vent, T (")	1	—	1	—	In "near" holdall.
Rimers, vent, T (")	—	1	—	1	In upper tray, ammunition box.
Ropes, drag, light pairs	1	1	1	1	On platform board.
Shell, shrapnel	42	32	42	32	In ammunition box.
Shot, case	2	2	2	2	In ammunition box.
Sights, B.L., fore,	2	—	—	—	In "off" holdall, when not on gun.
Sights, B.L., fore,	—	1	—	—	In upper tray of ammunition box, when not on gun.
Sights, B.L., fore, (spare)	—	—	—	1[a]	In upper tray of ammunition box, when not on gun.
Sights, B.L., fore, (")	—	—	1	—	In "off" holdall.
Sights, B.L., tangent,	2	—	—	—	One in "off" and one in "near" holdall, when not on gun.
Sights, B.L., tangent,	—	1	—	—	In upper tray of ammunition box, when not on gun.
Sights, B.L., tangent, (spare)	—	—	—	1[a]	In upper tray of ammunition box, when not on gun.
Sights, B.L., tangent, (")	—	—	1[a]	—	In "near" holdall.
Sights, B.L., telescopic	1	1	1[b]	1[b]	In box, on platform board.
Spades, N.P.[d]	2	2	2	2	One on each side of limber.

Springs, catch retaining breech mechanism	lever	(spare)	—	3	—	—	In upper tray of ammunition box.
	screw	(„)	—	3	—	—	
extractor		(„)	—	3	—	—	
guide bolt		(„)	—	3	—	—	
vent, axial		(„)	—	3	—	—	
Straps, kicking			—	—	1[c]	1[c]	On platform board.
securing, 44 inches × 1 inch		(spare)	1	1	1	1	On lid of camp kettle.
Swingletree, No. 10A		(spare)	1	1	1	1	On platform board.
Traces, harness, short		(„)	1	—	1	—	On footboard.
			—	1	—	1	On platform board.
saddlery, pairs		(„)	—	2	—	2	
			2	—	2	—	On footboard.
Trays, small stores			—	2	—	2	In ammunition boxes.
Tubes, friction, T			50	50	50	50	In T tube box.
Vent, T, axial			1	1	1	1	In ammunition box.
Washers, drag, 2nd Class C		(spare)	1[a]	1[a]	1[a]	1[a]	Under platform board, "near side."
Wrenches, breech mechanism, A			1	—	1	—	In "near" holdall.
B			—	1	—	—	In upper tray of ammunition box.
C			—	1	—	—	

[a] 1 per section, in "A," "C," and "E" subdivisions.
[b] 1 per battery spare, in "A" subdivision.
[c] Per battery, "A" subdivision.
[d] Will be superseded by "Shovels, G.S." when existing stock is used up.

AMMUNITION WAGON.

Description.	Mark I*.	Mark II.	Where carried.
Bags, kit	2	2	On top of box.
Blankets, G.S.	2	2	
Blocks, for T tubes	1	—	On lid of "off" ammunition box.
Blocks, retaining tube	—	1[a]	In tray small stores, ammunition box.
Bolt, stop	1[c]	—	In holdall, spare parts of gun.
Boxes, cartridge	—	16	In ammunition box.
Boxes, fuze, No. 20	3[b]	—	In ammunition box.
Boxes, fuze, ,, 31	—	5[b]	In ammunition box.
Boxes, grease, 14 lb.	2[b]	2[b]	Under wagon, rear of axletree.
Boxes, slide	—	1[a]	In tray small stores, ammunition box.
Boxes, T tubes	—	2[b]	In ammunition box.
Cap, sponge, No. 4	1	1	On sponge.
Carriers, case shot	—	1[b]	In ammunition box.
Carriers, shrapnel shell	—	15[b]	In ammunition box.
Cartouches	2	—	In ammunition box.
Cartridges, $12\frac{1}{16}$-oz. cordite, size 5	48	—	In ammunition box.
Cartridges, $12\frac{1}{16}$-oz. cordite, size 5	—	64	In 16 cartridge boxes.
Cases, saw, hand	1	—	On front of ammunition box.
Cases, saw, hand	—	1	On "off" side of wagon.
Collars, actuating	3	—	In holdall spare parts of gun.
Covers, cartridge	48	—	On cartridges.
Extractor, box slide	—	1	In tray small stores, ammunition box.
Fuzes, T and P	48	60	In 5 tin fuze boxes.
Grease, lubricating lb.	28	28	In boxes under wagons.
Handspike, common, 6 ft.	1	1	Under wagon.
Handspike, traversing, No. 2, Mark III.	—	1[a]	Front of wagon, on box.
Holdall, spare parts of gun	1[b]	—	In ammunition box.
Jacks, lifting, G.S.	1[a]	1[a]	On platform board.
Kettle, camp, oval, 12 qts.	2[c]	2[c]	Under wagon front of axletree.
Keys, fuze, universal	2[d]	2[d]	One in each pocket, rear of wagon.
Keys, lock	2	—	In pocket, rear of wagon.
Lashings, tarred, 1 in. × 10 ft.	3[a]	3[a]	Securing spare pole.
Lashings, tarred, 1 in. × 10 ft.	2[b]	2[b]	On axletree.
Line, Hambro	—	1	In centre compartment, front ammunition box.
Marline	—	1	In centre compartment, front ammunition box.
Magazines, portable	2	—	In rear of wagon.

[a] Per section, "A," "C," and "E" subdivisions.
[b] Issued with the wagon.
[c] As required.
[d] When the guns are parked, the fuze keys should be carried in the ammunition boxes, on all other occasions they should be carried in the pockets.
[e] Per battery, "A" subdivision.

AMMUNITION WAGON—*continued.*

Description.	Mark I*.	Mark II.	Where carried
Pinion, link	—	1[e]	In tray small stores, ammunition box.
Pins, keep { bolt, elevating ..	2	—	In holdall spare parts of gun.
Pins, keep { hinge bolt, carrier ring	2	—	In holdall spare parts of gun.
Pole, jointed, No. 18..	1[f]	1[f]	Under wagon.
Saws, hand, 26-inch	1	—	In case, front of ammunition box.
Saws, hand, 26-inch	—	1	In case, "off" side of wagon.
Shell, shrapnel	46	60	In ammunition box.
Shot, case	2	2	In ammunition box.
Spanner, No. 93	1[b]	1[b]	On "near" side of wagon.
Sponge, jointed, R.M.L., 13-pr. ..	1[g]	1[g]	Under wagon.
Springs, { catch, vent, T, axial ..	2	—	In holdall, spare parts of gun.
Springs, { clip, carrier ring ..	2	—	In holdall, spare parts of gun.
Springs, { retaining foresight ..	4	—	In holdall, spare parts of gun.
Springs, { stud, catch { left ..	2	—	In holdall, spare parts of gun.
Springs, { stud, catch { right ..	2	—	In holdall, spare parts of gun.
Straps, securing, 44 in. × 1 in. ..	2	—	On lids of camp kettles.
Tray, small stores	—	1	In ammunition box.
Tubes, { T	50	70	In ammunition box.
Tubes, { friction, T drill ..	1	—	In "near" holdall.
Tubes, { friction, T drill ..	—	1	In tray small stores, ammunition box.
Washers, { arm axletree, 2nd Class C { $\frac{1}{16}$" thick	1	—	Under holdall, in "off" ammunition box.
Washers, { arm axletree, 2nd Class C { $\frac{1}{16}$" thick	—	1	In tray small stores, ammunition box.
Washers, { arm axletree, 2nd Class C { $\frac{3}{32}$" „	1	—	Under holdall, in "off" ammunition box.
Washers, { arm axletree, 2nd Class C { $\frac{3}{32}$" „	—	1	In tray small stores, ammunition box.

[b] Issued with the wagon.
[e] Per battery, "A" subdivision.
[f] "A," "C," "E," and "F" subdivisions.
[g] Per battery, "B" subdivision.

LIST OF STRAPPING.

CARRIAGE.

Size in inches.	Service for which Straps are required.	Mark I*.	Mark II.	Position of Straps.
¾ × 9	Case, No. 9 oil can	—	1	On right side.
¾ × 10	Posts, aiming	1	1	On left side.
¾ × 13	Lever, releasing spade† ..	1	—	On right side.
¾ × 30 Double	Cleaners	2	2	One on each tensile stay.
1 × 13	Hammer, claw	—	1	On left side (near trunnion).
1 × 13	Pincers	—	1	On left side.
1 × 13	Spanner, McMahon.. ..	—	1	„ right side.
1 × 22 D.L.	Wheel, hand	1	—	„ carriage. close to hand-wheel.
	„ „	—	1	„ left tensile stay. close to hand-wheel.

† Component of carriage.

LIMBER.

Size in inches.	Service for which Straps are required.	Mark I.	Mark II.	Position of Straps.
¾ × 6	Box, telescopic sight ..	1	2	Front of limber, on box.
¾ × 13	„ „ „ ..	1	—	
¾ × 13	Spades	2	2	One on each side.
1 × 10 Double with loop	Axe, pick	1	—	Under limber.
1 × 10	„ „	—	1	„ footboard.
1 × 10	Brush, water	—	1	Under footboard "near" side.
1 × 10	Hook, bill	—	1	Under footboard "off" side.
1 × 10	Kettle, camp (handle) ..	1	1	Under limber.
1 × 13	Axe, felling	—	1	„ footboard.
1 × 13	„ pick	1	1	„ limber.
1 × 13	Brush, water	1	—	On futchel "near" side.
1 × 13	Hook, bill	1	—	„ „ "off" side.
1 × 13	Washer, drag	1	1	Under platform board.
1 × 18	Axe, felling	1	—	„ footboard.
1 × 18	„ pick	1	—	„ limber.
1 × 22	Spades (handles)	2	2	One on each side.
1 × 26	Bags, kit	4	4	On top of box.
1 × 26	Box, grease, 3 lbs.	1	1	Under limber, at rear.
1 × 26	Case, oil can..	1	1	„ „ „
1 × 30	Ropes, drag, pole bar, swingletrees, &c.	2	2	On platform board.
1 × 32 B.P., C.B.	Blankets	4	—	On top of limber.
1 × 36 with running loop	„	—	4	
1 × 44	Cloaks	—	4	On top of limber.
1 × 44	Kettle, camp (lid)	1	1	Under limber.
1 × 44	Magazines, portable.. ..	2	—	Rear of limber on box.
1 × 48	Box, telescopic sight ..	—	1	Front of limber.
1 × 54	„ „ „ ..	1	—	

List of Strapping—*continued.*

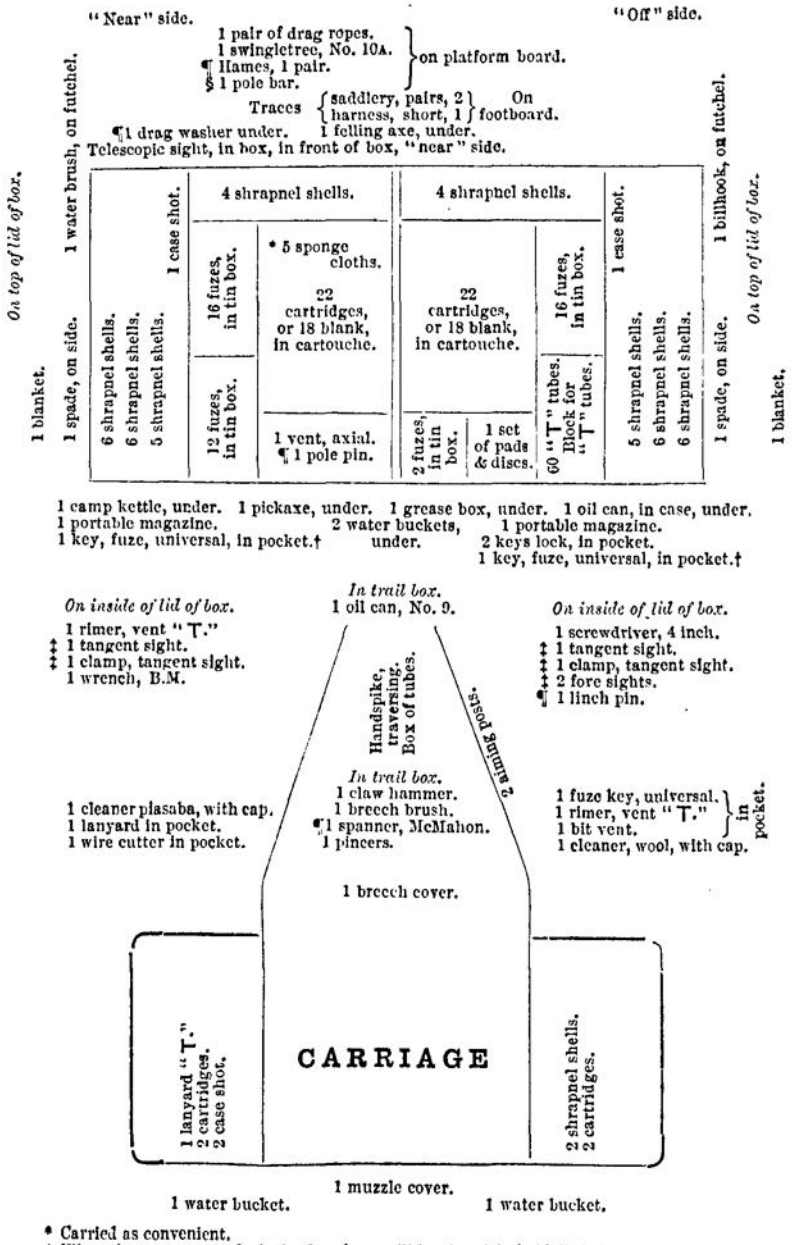
AMMUNITION WAGON.

Size in inches.	Service for which Straps are required.	Mark I.	Mark II.	Position of Straps.
1 × 10	Kettles, camp (handle) ..	2	2	Under wagon.
1 × 13	Handspike, traversing ..	—	1	Front of wagon, on box.
1 × 13	Spanner, No. 93	1	1	On box, "near" side.
1 × 18	Handspike, traversing ..	—	1	Front of wagon, on box.
1 × 22	,, common ..	—	1	Under wagon, at front.
1 × 22	Sponge, jointed	—	2	,, ,, (1 at front and 1 at rear).
1 × 26	Bags, kit	4	4	On top of wagon.
1 × 26	Sponge, jointed	1	—	Under wagon.
1 × 30	Jack, lifting, G.S.	2	2	On footboard.
1 × 32 B.P., C.B.	Blankets	4	—	On top of wagon.
1 × 36	Handspike, common ..	—	1	Under wagon, at rear.
1 × 44	Cloaks	—	4	On top of wagon.
1 × 44	Handspikes, common ..	1	—	Under wagon.
1 × 44	Kettles, camp (lid)	2	2	Under wagon.
1 × 44	Magazines, portable ..	2	—	Rear of wagon, on box.
1 × 44 with loose loop	Blankets	—	6	On top of wagon.

A MARK I*

12-PR. B.L. 6-CWT., CARRIAGE AND LIMBER.

LIMBER.



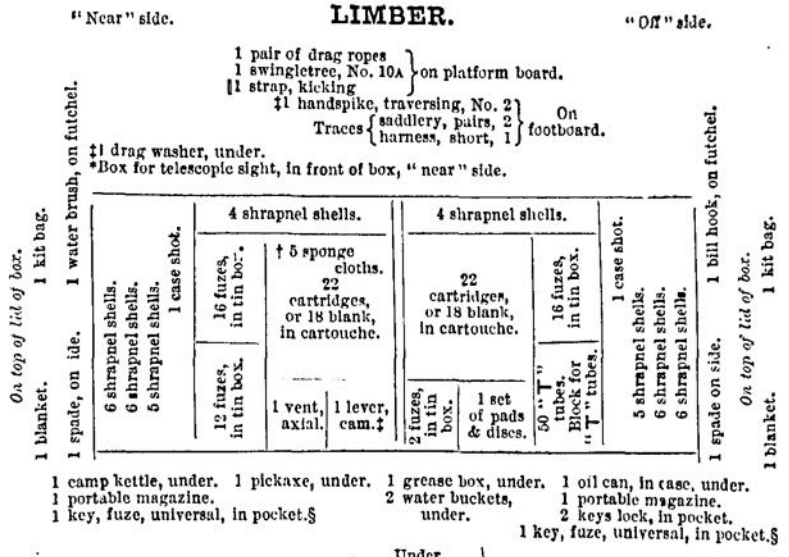
1 camp kettle, under. 1 pickaxe, under. 1 grease box, under. 1 oil can, in case, under.
1 portable magazine. 2 water buckets, under. 1 portable magazine.
1 key, fuze, universal, in pocket.† 2 keys lock, in pocket.
1 key, fuze, universal, in pocket.†

* Carried as convenient.
† When the guns are parked, the fuze keys will be placed in holdall, in limber.
‡ When not in gun.
¶ Per section, carried in "A," "C," and "E" subdivisions.
§ " " "B," "D," " "F" "

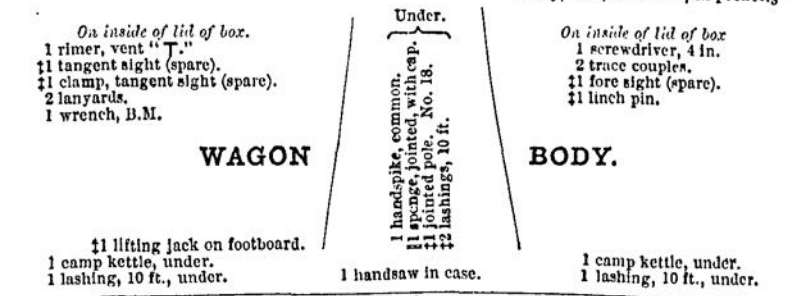
EQUIPMENT. A

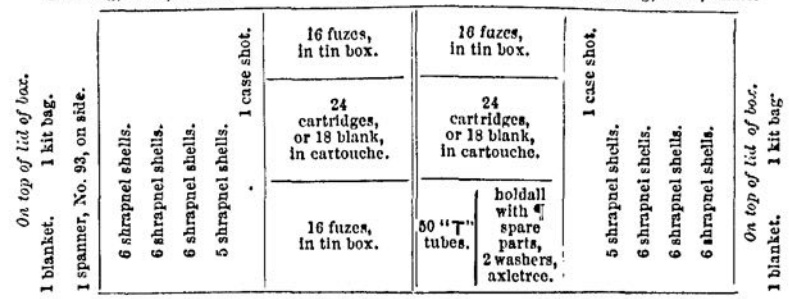
12-PR. B.L. 6-CWT., WAGON AND LIMBER.

LIMBER.



WAGON BODY.

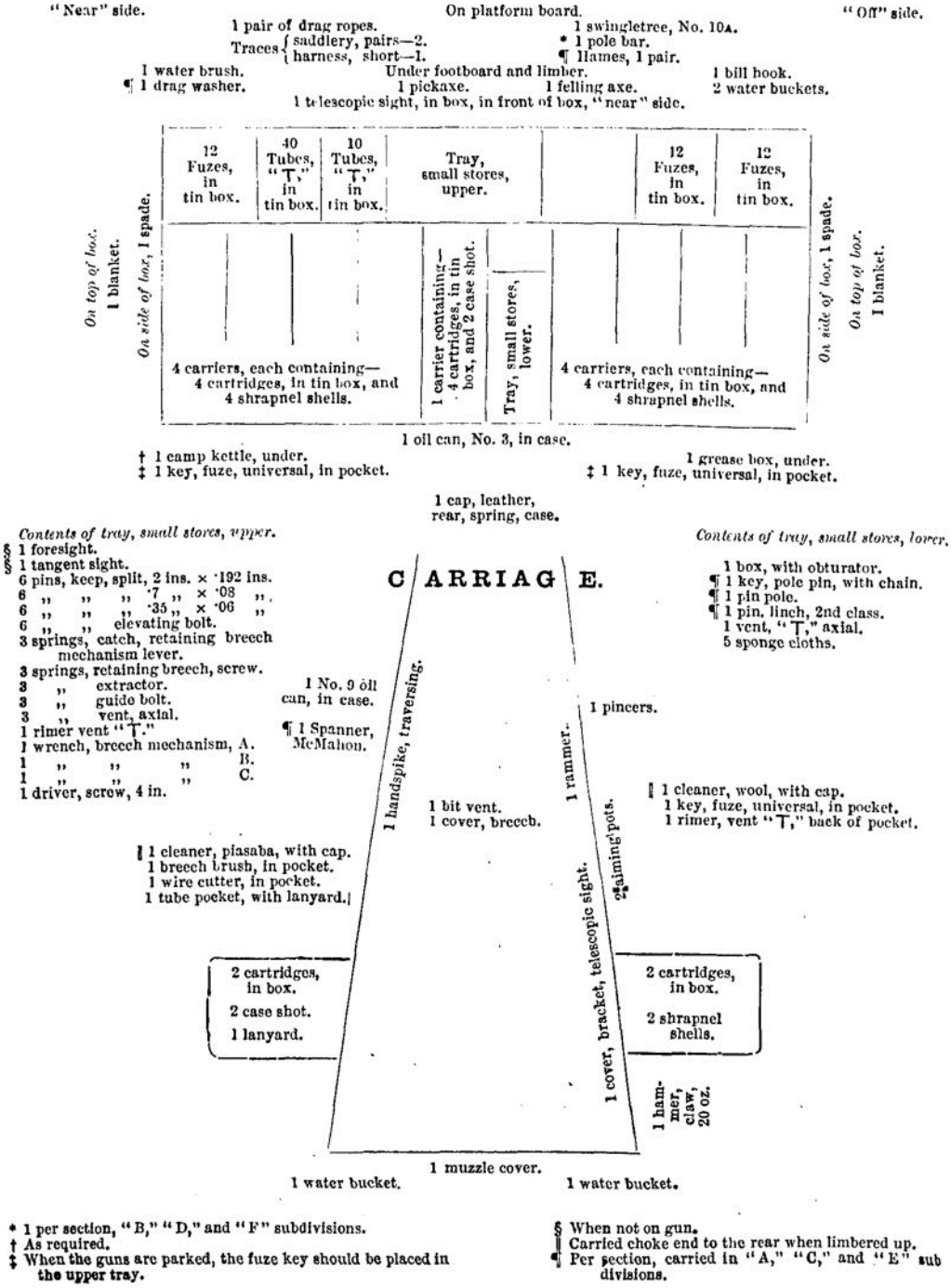




* 1 spare sight per battery, with "A" subdivision.
† Carried as convenient.
‡ Per section, carried in "A," "C," and "E" subdivisions.
§ When the guns are parked, the fuze keys will be placed in holdall, in limber.
‖ 1 per battery, "B" subdivision.
¶ Contents of holdall. 1 bolt stop, 3 collars, actuating, 2 pins, keep, carrier ring. 2 pins, keep, bolt elevating, 2 springs, catch, vent, axial, 2 springs, clip, carrier ring. 2 springs, stud, catch, left, 2 springs, stud, catch, right. 4 springs, retaining fore sight.

B.L., 12-PR., 6-CWT., CARRIAGE AND LIMBER.

LIMBER.



Contents of tray, small stores, upper.

1 foresight.
1 tangent sight.
6 pins, keep, split, 2 ins. × ·192 ins.
6 " " " ·7 " × ·08 "
6 " " " ·35 " × ·06 "
6 " " elevating bolt.
3 springs, catch, retaining breech mechanism lever.
3 springs, retaining breech, screw.
3 " extractor.
3 " guide bolt.
3 " vent, axial.
1 rimer vent "T."
1 wrench, breech mechanism, A.
1 " " " B.
1 " " " C.
1 driver, screw, 4 in.

1 No. 9 oil can, in case.

¶ 1 Spanner, McMahon.

Contents of tray, small stores, lower.

1 box, with obturator.
¶ 1 key, pole pin, with chain.
¶ 1 pin pole.
¶ 1 pin, linch, 2nd class.
1 vent, "T," axial.
5 sponge cloths.

1 muzzle cover.
1 water bucket.
1 water bucket.

* 1 per section, "B," "D," and "F" subdivisions.
† As required.
‡ When the guns are parked, the fuze key should be placed in the upper tray.

§ When not on gun.
‖ Carried choke end to the rear when limbered up.
¶ Per section, carried in "A," "C," and "E" sub divisions.

B.L., 12-PR., 6-CWT., WAGON AND LIMBER.

LIMBER.

"Near" side. On platform board. "Off" side.

1 pair of drag ropes.
1 swingletree, No. 10A.

Traces { saddlery, pairs 2. harness, short, 1.
‖ 1 strap, kicking.

Under footboard and limber.

water brush.
§ 1 drag washer.
* 1 telescopic sight, in box, in front of box, "near" side.
1 pickaxe.
1 bill hook.
2 water buckets.

On top of box. 1 kit bag. 1 blanket.

On side of box, 1 spade.

12 Fuzes, in tin box. | 40 Tubes, "T" in tin box. | 10 Tubes, "T" in tin box. | Tray, small stores, upper. | 12 Fuzes, in tin box. | 12 Fuzes, in tin box.

4 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

1 carrier, containing— 4 cartridges, in tin box, and 2 case shot.

Tray, small stores, lower.

4 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

On side of box, 1 spade.

On top of box. 1 kit bag. 1 blanket.

1 oil can, No. 3, in case.

† 1 camp kettle, under.
‡ 1 key, fuze, universal, in pocket.

1 grease box, under.
‡ 1 key, fuze, universal, in pocket.

Contents of tray, small stores, upper.

2 lanyards.
1 rimer, vent "T."
§ 1 fore sight (spare).
§ 1 tangent sight (spare).
1 driver, screw, 4 in.

Contents of tray, small stores, lower.

1 vent "T," axial.
1 box, with obturator.
5 sponge cloths.
§ 1 linch pin.

Under.

1 handspike, common.
†† 1 sponge, jointed, with cap.
‡‡ 1 pole, jointed.
‡‡ 3 lashings, 10 ft.

WAGON BODY.

† 1 camp kettle. 1 lashing, 10 ft. } under.
§ 1 lifting jack, on footboard.
§ 1 handspike, traversing, on front of box.
† 1 camp kettle. 1 lashing, 10 ft. } under.

Front compartment.

2 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

1 skein of marline. 1 hambro line.

2 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

On top of box. 1 kit bag. 1 blanket.

On side of box, 1 spanner, No. 93.

12 Fuzes, in tin box. | 12 Fuzes, in tin box. | 12 Fuzes, in tin box. | Tray, small stores. | 40 Tubes, "T" in tin box. | 30 Tubes, "T" in tin box. | 12 Fuzes, in tin box. | 12 Fuzes, in tin box.

5 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

1 carrier, containing 4 cartridges, in tin box, and 2 case shot.

6 carriers, each containing— 4 cartridges, in tin box, and 4 shrapnel shells.

On side of box, 1 handsaw, in case.

On top of box. 1 kit bag. 1 blanket.

Contents tray, small stores

§ 1 box slide.
‖ 1 pinion link.
§ 1 block retaining tube.
1 extractor, box slide.
2 washers, axletree, arm.
1 drill tube.

1 grease box, 14 lb., under.
1 key, fuze, universal, pocket.

1 grease box, 14 lb., under.
1 key, fuze, universal, pocket.

† As required.
* 1 spare sight per battery, with "A" subdivision.
‡ When the guns are parked, the fuze key should be placed in the tray for small stores.
§ Per section, carried in "A," "C," and "E" subdivisions.

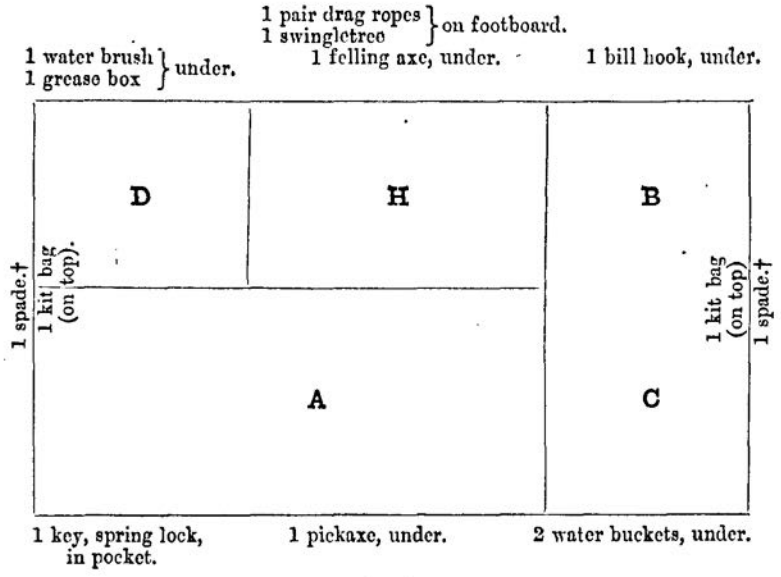
‡‡ Carried under wagon of "A," "C," "E," and "F" subdivisions.
‖ Per battery, "A" subdivision.
†† Carried under wagon of "B" subdivision.

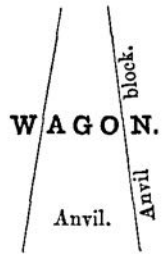
C

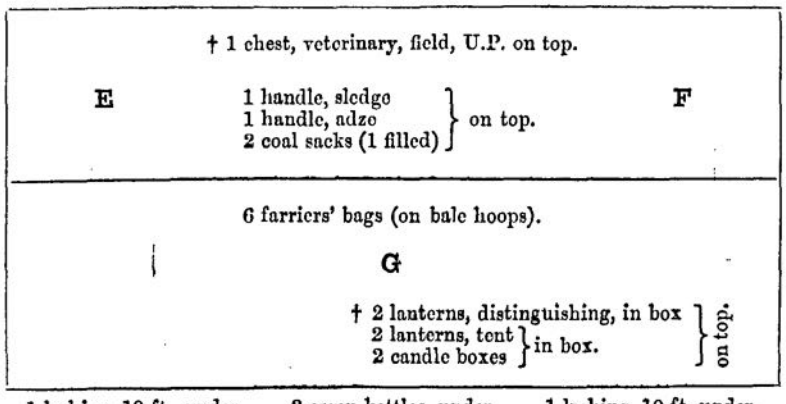
WAGONS, FORGE, R.A., MARKS I* AND II.

(PACKED FOR 12-PR. 6-CWT., MARK I* AND II, B.L. EQUIPMENTS.)

LIMBER.







† Will be superseded by "Shovels, G.S." when existing stock is used up.

C

COMPARTMENT "A" (Bottom of Limber Box).

Dubbing .. .. ..
Glue.. .. .. ..
Oil, olive .. .. ..
Oil, Rangoon .. ..
Wax, black .. ..

COMPARTMENT "B" (Bottom of Limber Box).

Dubbing .. .. ..

TRAY "C."

Vice, bench.. .. ..
Cards, towsing .. ..

TRAY "D."

Couples, trace .. .. ..
Chain, brass .. .. ..
Keys, capsquare .. ..
Keys, guard iron .. ..
Keys, lock .. ..
Keys, pole pin .. .. ..
Locks, ammunition box.. ..
Locks, pad .. ..
Pin, linch .. ..
Springs, pawl, supporting spade
Springs, spiral, brake block ..
Staples, round, crowned ..
Staples, lashing, $\frac{5}{16}$-inch ..
Staples, lashing, with plate
Turnbuckles .. .. ..
Washer, drag .. .. ..

TRAY "A."

Bolts, elevating .. ..

COMPARTMENT "H."

‡Handle, lever, forge .. ..
Lever, supporting brake block ..
Nuts, actuating .. .. ..
Pins, axis rocking lever ..
Pins, coupling .. .. ..
Pins, locking, brake shoe ..
Pins, locking, releasing lever
Shackles, wire rope .. ..
Springs, spiral, recoil .. ..

COMPARTMENT "E" (Wagon).

Set of smiths' tools; set of tinmen's tools; forge and shoeing tools (farriers'); with borax, resin, solder, sal-ammoniac, spelter, sawyers' wedges, sponge cloths, and handbooks "Military Artificer's."

COMPARTMENT "F" (Wagon).

Set of wheelers' tools'; with bolts, nails, keys loop, rivets, screws, and tacks (also basil aprons on top of tool chest.)

COMPARTMENT "G" (Wagon).

†Forge (with poker and slice) ..
Grindstone, 10-in. .. ..
Hammers, sledge, farriers' ..
Hammers, sledge, smiths' ..
Tongs, farriers', fire .. ..

---

† The Mark I* wagon carries the Mark II G.S. field forge; the Mark II wagon carries either the Mark II G.S. field forge, or the Mark IV R.A. field forge.

‡ When Mark IV forge is carried only.

D

WAGON, STORE, R.A., MARK I.

(PACKED FOR 12-PR. B.L. 6 CWT. MARKS I* AND II EQUIPMENTS).

LIMBER.

1 pair drag ropes, 1 swingletree } on footboard.

1 water brush, 1 grease box } under.

1 felling axe, under.

1 bill hook, under.

1 spade.†

A

E

B

C

D

1 spade.†

1 key, spring lock, in pocket.

1 pickaxe, under.

2 water buckets, under.

WAGON.

1 chest No. 5A, on top.
1 case of butchery implements, on top.

F

12 reaping hooks, on top.

12 reaping hooks, on top.

J { 1 package spare harness in saddle blanket } on top.

1 crow bar, under.

1 swingletree, on top.

H

K { 1 package spare harness in saddle blanket } on top.

G

1 swingletree, on top.

2 lanterns, tent
2 candle boxes } in box on top.

1 lashing, 10 ft., under.

2 camp kettles, under.

1 lashing, 10 ft., under.

† Will be superseded by "Shovels, G.S." when existing stock is used up.

D

COMPARTMENT "A" (Bottom of Limber Box).

Soap, yellow,

COMPARTMENT "B" (Bottom of Limber Box).

Oil, rangoon,

LOWER TRAY "C" (In two boxes).

Buckles. Rivets. Staples. Tallow.
Needles. Squares. Tacks.

UPPER TRAY "D."

Couples, trace .. Pin, linch .. .. Handcuffs .. .. ..
Locks, pad .. Stone, rub .. .. Washer, drag .. ..

COMPARTMENT "E."

Soap, yellow .. Tow, coarse ..

Bandages, &c., *for Sick Horses.*

COMPARTMENT "F" (WAGON).

Arches { harness .. / saddlery ..
Bars { harness .. / saddlery ..
Basils, unstrained ..
Bits, bridoon, hooks ..
Blankets, old .. ..
Canvas, sail .. ..
Cloth, strappings ..
Cordage, hawser ..
Cord { cotton .. .. / whip .. ..
Felloes { No. 35A .. / „ 36 or 42
Felt, brown .. ..
Glue .. .. ..
Hair, horse .. ..
Hammer, sledge ..
Hooks, draught ..
Hides, various ..
Keys, limber hook ..
Linen, old .. ..
Links, curved.. ..
Pipes, trace, strips ..
Serge, collarmakers ..
‡Steels { limber hook / trail eye ..
Straps, various ..
Thread { flax .. / whited brown
Traces { attachments / hooks ..
Twine, quilting ..
Worsted, grey ..

COMPARTMENT "G" (WAGON).

† Bracket, sight telescopic .. ..
† Carrier .. ..
‡ Ring, carrier .. .. } in tray.
† Lever breech mechanism .. ..
Screw, breech .. ..

Blocks, brake .. .. ..
‡Blocks, wood .. .. ..
†Bolts, connecting .. ..
Clams, collarmakers .. ..
Cylinders, paint, with mineral jelly .. ..
‡Iron, 2 ft. 8 in., bolt .. ..
‡Iron, 2 ft. 8 in., flat .. ..
Ropes, wire recoil case ..
Spokes { No. 35A .. .. / „ 36 .. .. / „ 42 .. ..
† Steel pieces { bolt .. .. / flat .. .. / plate .. .. / tire .. ..
Wheel, hand .. .. ..
Wire, copper .. .. ..

COMPARTMENT "H" (WAGON).

Capsquares .. .. .. ‡ Iron plate, 1 ft. 6 in. ..

COMPARTMENT "I" (WAGON).

Stationery.

CONTENTS OF PACKAGE "J."

Bags, nose		4
Bits, portmouth, reversible	Mark II ..	5
	heads, bridle ..	2
Chains, hame		3
Leggings, drivers'		2
Links, double		4
Pannels, numnah		5
Traces, harness, wheel, pairs ..		1
Whips, drivers'		6
Bits { bridoon		4
Bits { portmouth	chains, curb	6
	hooks, curb	12
Irons, stirrup, G.S.		18
Leathers, stirrup		18

CONTENTS OF PACKAGE "K."

Bags, nose		4
Breechings		1
Collars, head, R.A...		3
Girths, leather		4
Hooks, pole bar		6
Pannels, numnah		6
Pieces, buckling, 1¼-inch		2
Reins { bearing		4
Reins { side		2
Runners, stirrup leather		18
Straps { breast, breechings ..		2
Straps { flank		4
Straps { hame		3
Straps { wither, 1¼-inch		2
Straps { polo		6
Straps { cloak and wallet		2
Straps { centre		2
Straps { shoe, case		1
Surcingles, leather harness ..		2

NOTE.—Each package wrapped in saddle blanket and secured by a stirrup leather.
† Mark II equipment. ‡ Mark I* equipment.

E

WAGON, STORE, R.A., MARK II.

(PACKED FOR 12-PR. 6 CWT. B.L., MARKS I* AND II, EQUIPMENTS.)

LIMBER.

1 pair drag ropes, 1 swingletree } on footboard.

1 drag washer, 1 water brush } under.

1 felling axe, under.

1 bill hook under.

1 spade.†

A

E

B

C

D

1 spade.†

1 key, spring lock, in locket.

1 pickaxe, under.

2 water buckets, 1 grease box } under.

WAGON.

1 camp kettle, under.

1 crow bar, 1 camp kettle } under.

1 chest No. 5A., 1 case, butchery implements } on top.

I.

12 reaping hooks, on top.

12 reaping hooks, on top.

II.

1 swingletree, on top.

F — 1 package spare harness in saddle blanket } on top.

1 swingletree, on top.

G — 1 package spare harness in saddle blanket } on top.

III.

IV.

2 lanterns, text, 2 candle boxes } in box, on top.

1 lashing, 10 ft., under.

1 lashing, 10 ft., under.

† Will be superseded by "Shovels, G.S.," when existing stock is used up.

E

COMPARTMENT "A" (Bottom of Limber Box).

Soap, yellow.

COMPARTMENT "B" (Bottom of Limber Box).

Oil, Rangoon.

LOWER TRAY "C."

(In two boxes.)

Buckles. Needles. Rivets. Squares. Staples. Tacks. Tallow.

UPPER TRAY "D."

Couples, trace.. .. Locks, pad .. ..
Pin, linch .. .. Stone, rub .. ..
Handcuffs .. .. Washer, drag ..

COMPARTMENT "E."

Soap, yellow. Tow, course. Bandages, &c., for sick horses.

BOX I (WAGON).

Arches { harness .. saddlery ..
Bars { harness .. saddlery ..
Canvas, sail .. ..
Cloth, strappings ..
Cordage, hawser ..
Felloes { No. 35A .. No. 36 or 42
Felt, brown.. ..
Hammer, sledge ..
Hair, horse .. ..
Hooks, draught ..
Keys, limber hook ..
†Steels { limber hook.. trail eye ..
Straps, various ..

BOX II (WAGON).

Bits, bridoon hooks ..
Basils, unstrained ..
Blankets, old .. ..
Clams, collarmakers'..
Cord { cotton .. whip ..
Hides, various ..
Linen, old .. ..
Links, curved ..
Pipes, trace, strips..
Serge, collarmakers'
Thread { flax .. .. whited brown
Traces { attachments.. hooks ..
Twine, quilting ..
Worsted, grey.. ..

BOX III (WAGON).

‡Bracket, sight, telescopic .. ‡Carrier .. .. .. ‡Lever, breech mechanism .. †Ring, carrier .. .. .. Screw, breech.. .. .. } in tray.

Blocks, brake ..
†Blocks, wood ..
‡Bolts, connecting ..
Capsquares .. ..
Cylinders, paint with mineral jelly
†Iron { tire .. .. plate, 1 ft. 6 in.
†Iron, 2 ft. 8 in. { bolt flat
Ropes, wire recoil case
‡Steel, pieces { bolt .. flat .. plate tire ..
Spokes { No. 35A .. Nos. 36 or 42
Wheel, hand .. ..
Wire, copper .. ..

BOX IV (WAGON).

Stationery.

CONTENTS OF PACKAGE "F."

Bags, nose	4
Bits, portmouth, reversible { Mark II ..	5
{ heads, bridle ..	2
Chains, hame	3
Leggings, drivers'	2
Links, double	4
Pannels, numnah	5
Traces, harness, wheel, pairs ..	1
Whips, drivers'	6
Bits { bridoon	4
{ portmouth { chains, curb..	6
{ hooks, „ ..	12
Irons, stirrup, G.S.	18
Leathers, stirrup	18

CONTENTS OF PACKAGE "G."

Bags, nose	4
Breechings	1
Collars, head, R.A.	3
Girths, leather	4
Hooks, pole bar	6
Pannels, numnah	6
Pieces, buckling, 1½ in.	2
Reins { bearing	4
{ side	2
Runners, stirrup leather	18
Straps { breast breeching.. ..	2
{ flank	
{ hame	3
{ wither, 1½ in.	2
{ pole	6
{ cloak and wallet	2
{ centre	2
{ shoe case	1
Surcingles, leather harness ..	2

NOTE:—Each package wrapped in saddle blanket and secured by a stirrup leather.

† Mark I* equipment. ‡ Mark II equipment.

ALTERATIONS.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

Para. of L. of C.	Nature of Change.	Remarks.

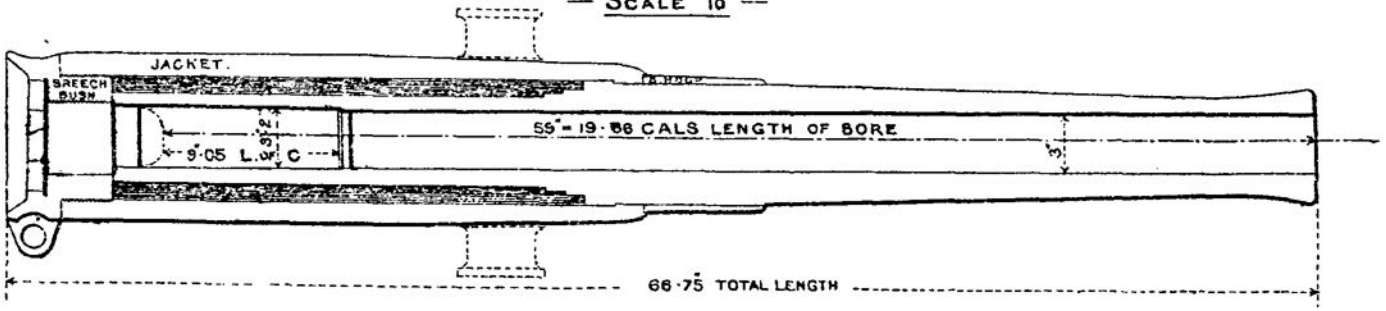
Para. of L. of C.	Nature of Change.	Remarks.

(Wt. 28526 1,500 4 | 03—H & S 2020) P. 02 1,000

ORDNANCE, B.L., 12 PR 6 CWT.

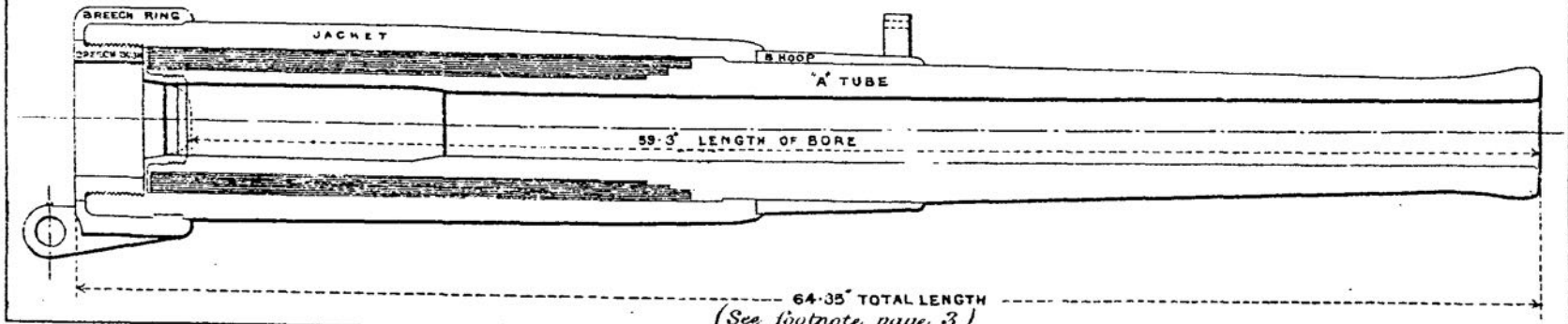
— MARK I. —

— SCALE 1/10 —



— MARK II —

— SCALE 1/8 —



(See footnote page 3)

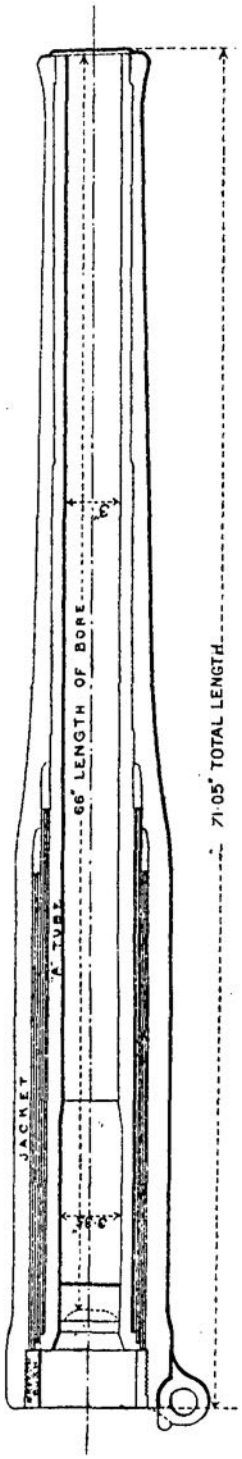
E. Weller & Grahams, Ltd Litho. London.

Plate I.

ORDNANCE, B.L. 12 PR. 6 CWT.

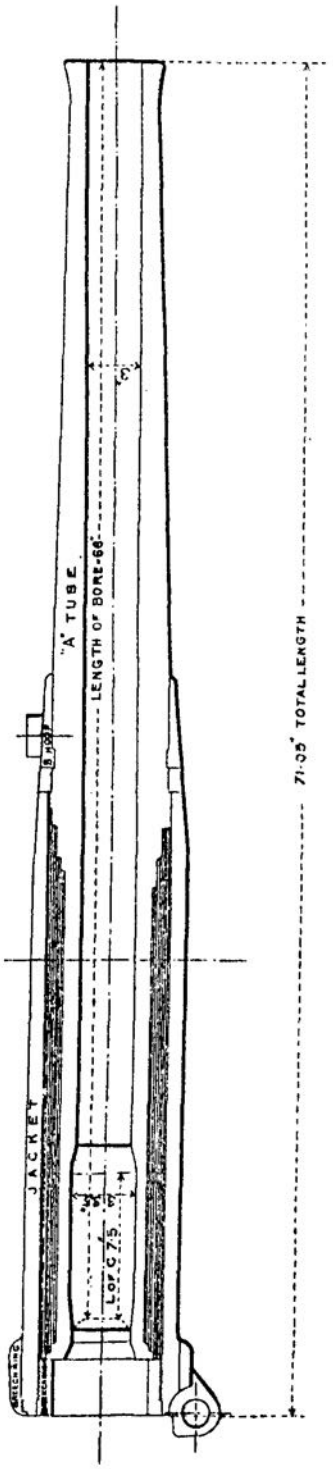
— MARK III. —

— SCALE $\frac{1}{10}$. —



— MARK IV. —

— SCALE $\frac{1}{10}$ —



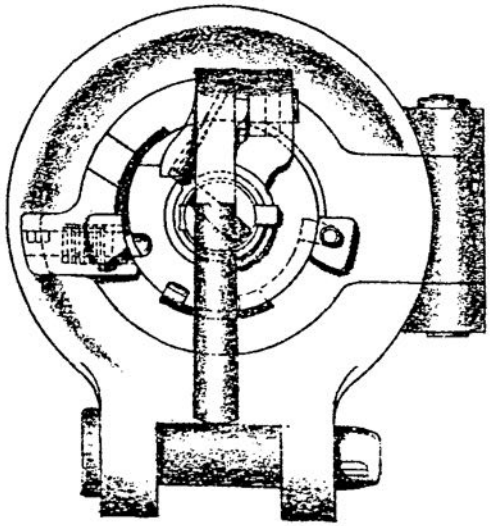
3452. 9. 1902

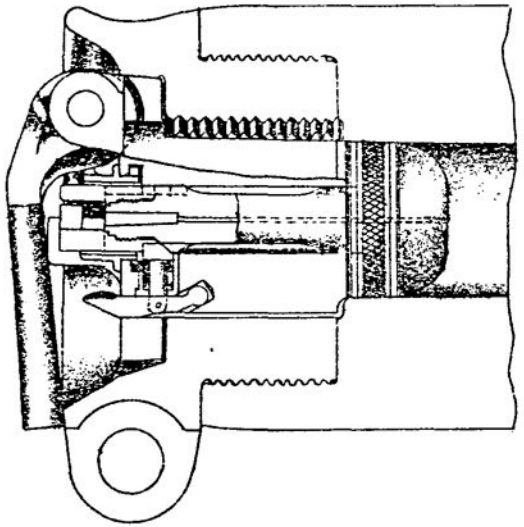
E. Weller & Grahams, Ltd Litho. London.

ORDNANCE ., B . L., 12- PR, 6- CWT. MARK I .

GENERAL ARRANGEMENT OF BREECH MECHANISM .

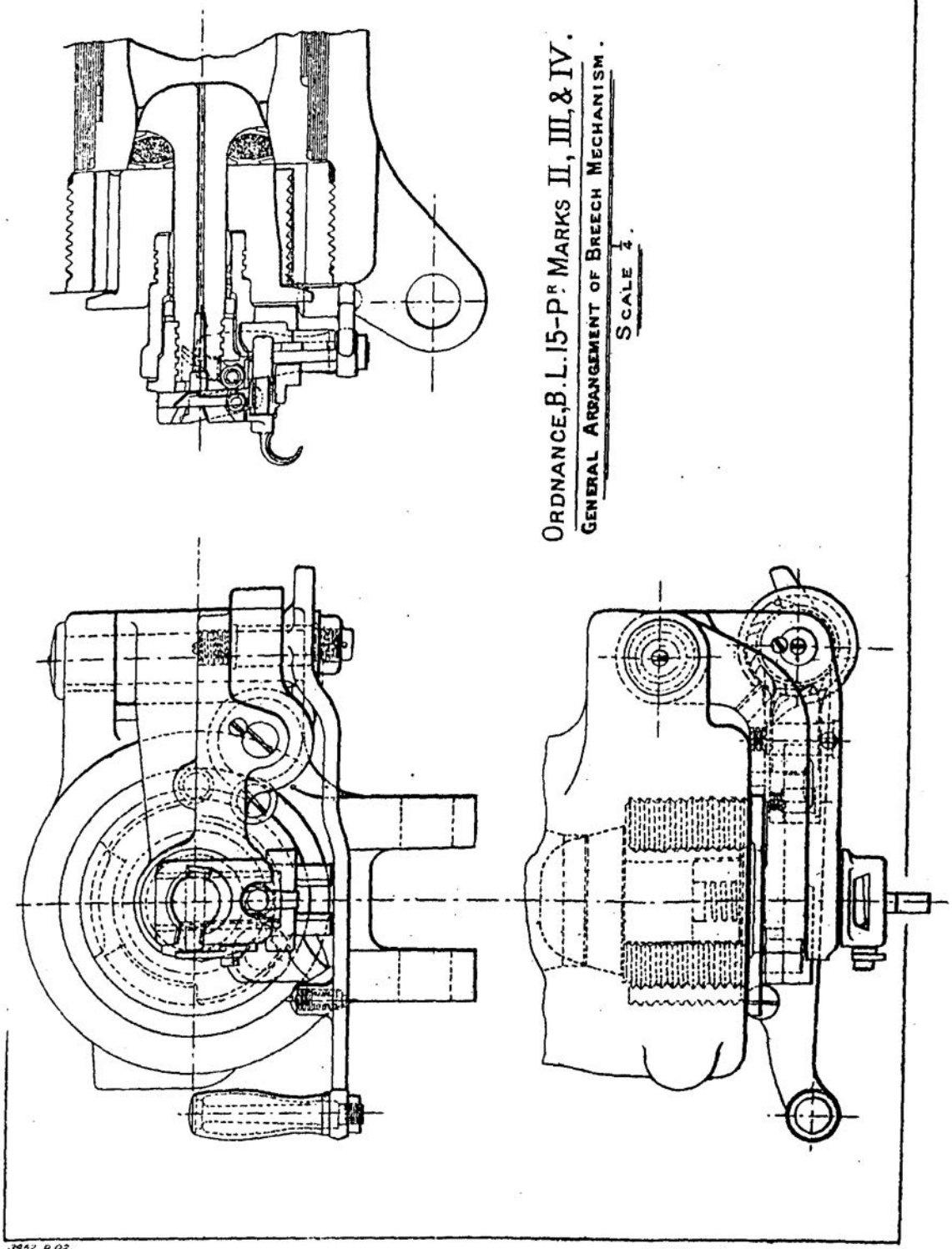
SCALE ½





E. Weller & Grahams, Ltd Litho. London.

Plate III.



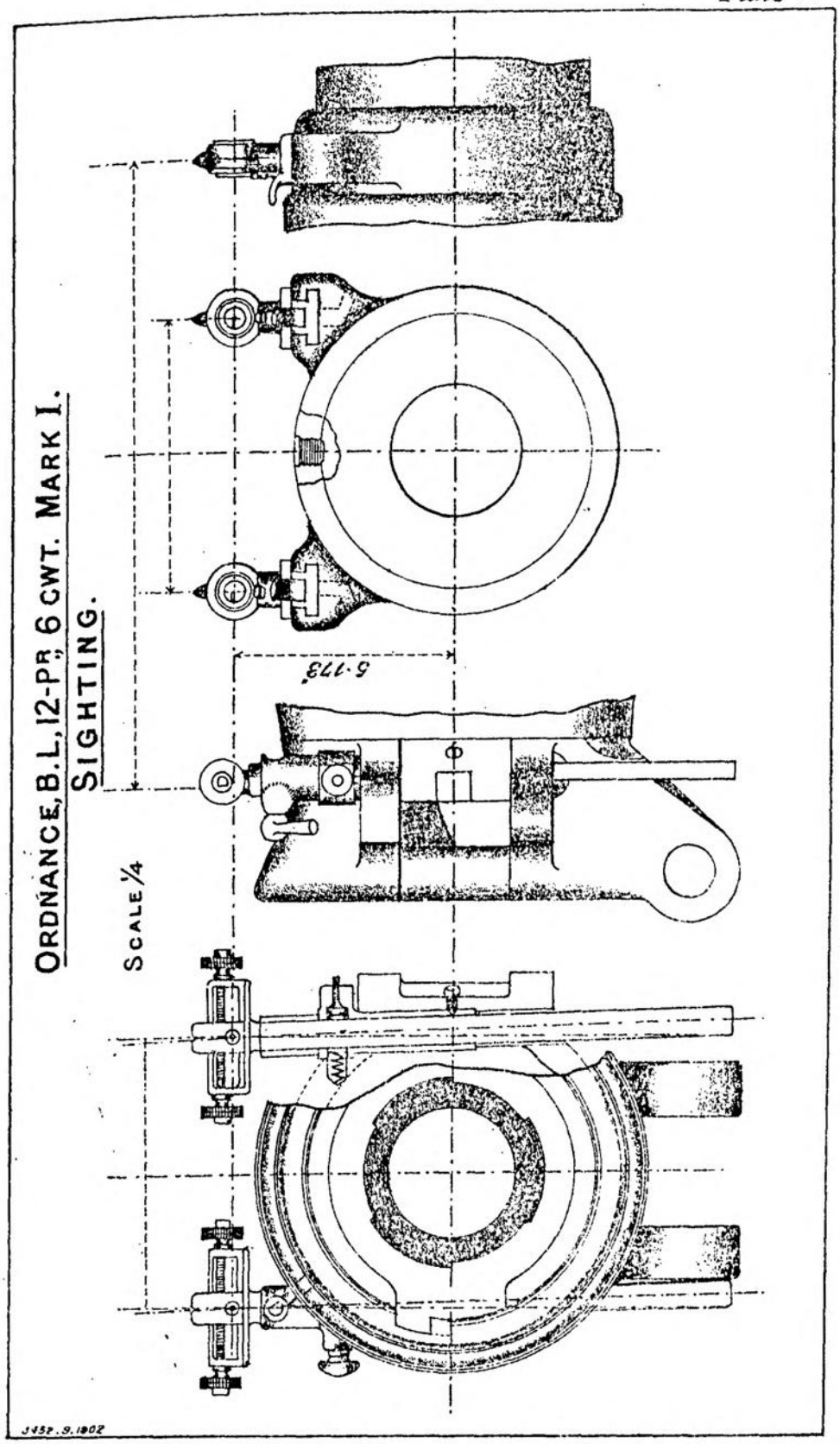
ORDNANCE, B.L. 15-Pr. MARKS II, III, & IV.

GENERAL ARRANGEMENT OF BREECH MECHANISM.

SCALE ¼.

1952. 9 02.

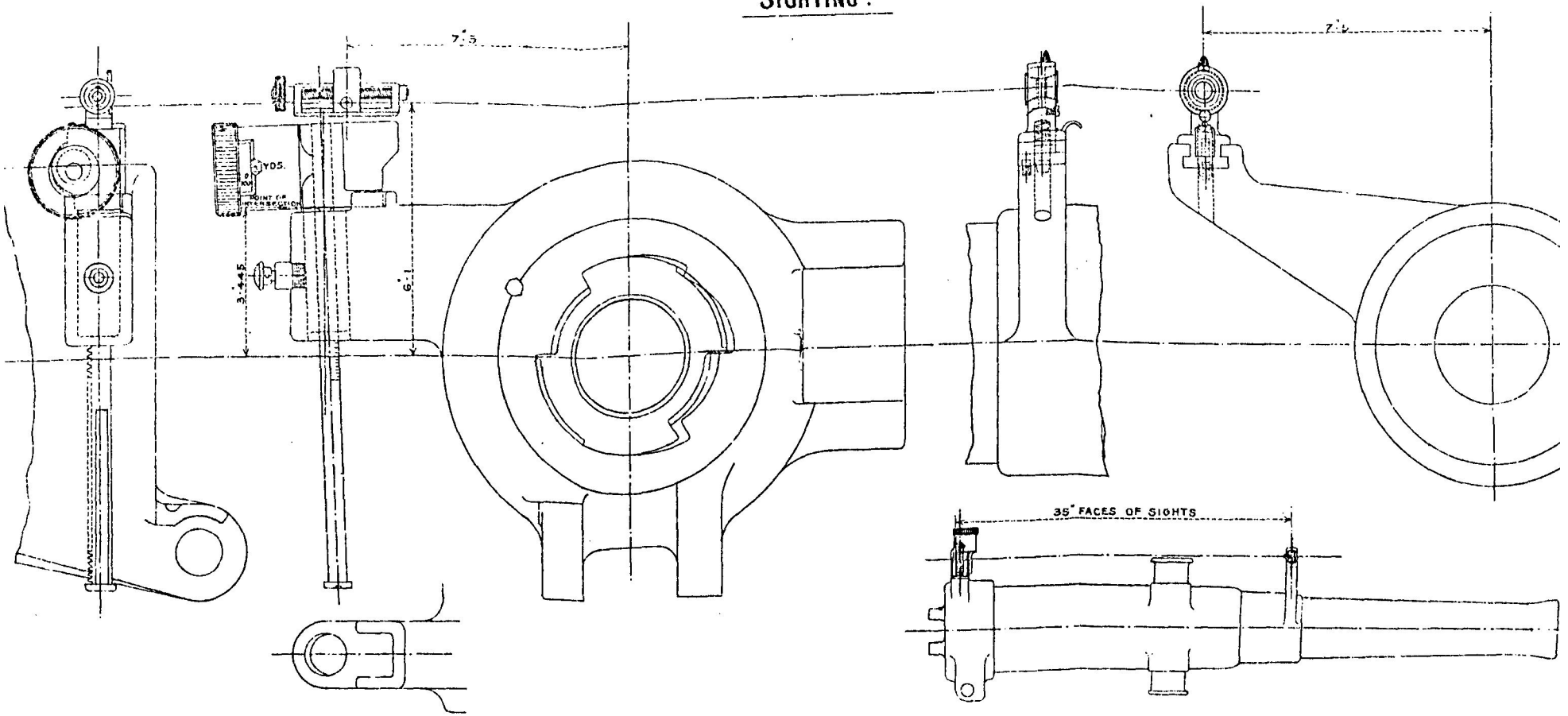
E. Weller & Grahams, Ltd Litho. London.



E. Weller & Grahams. Ltd Litho. London.

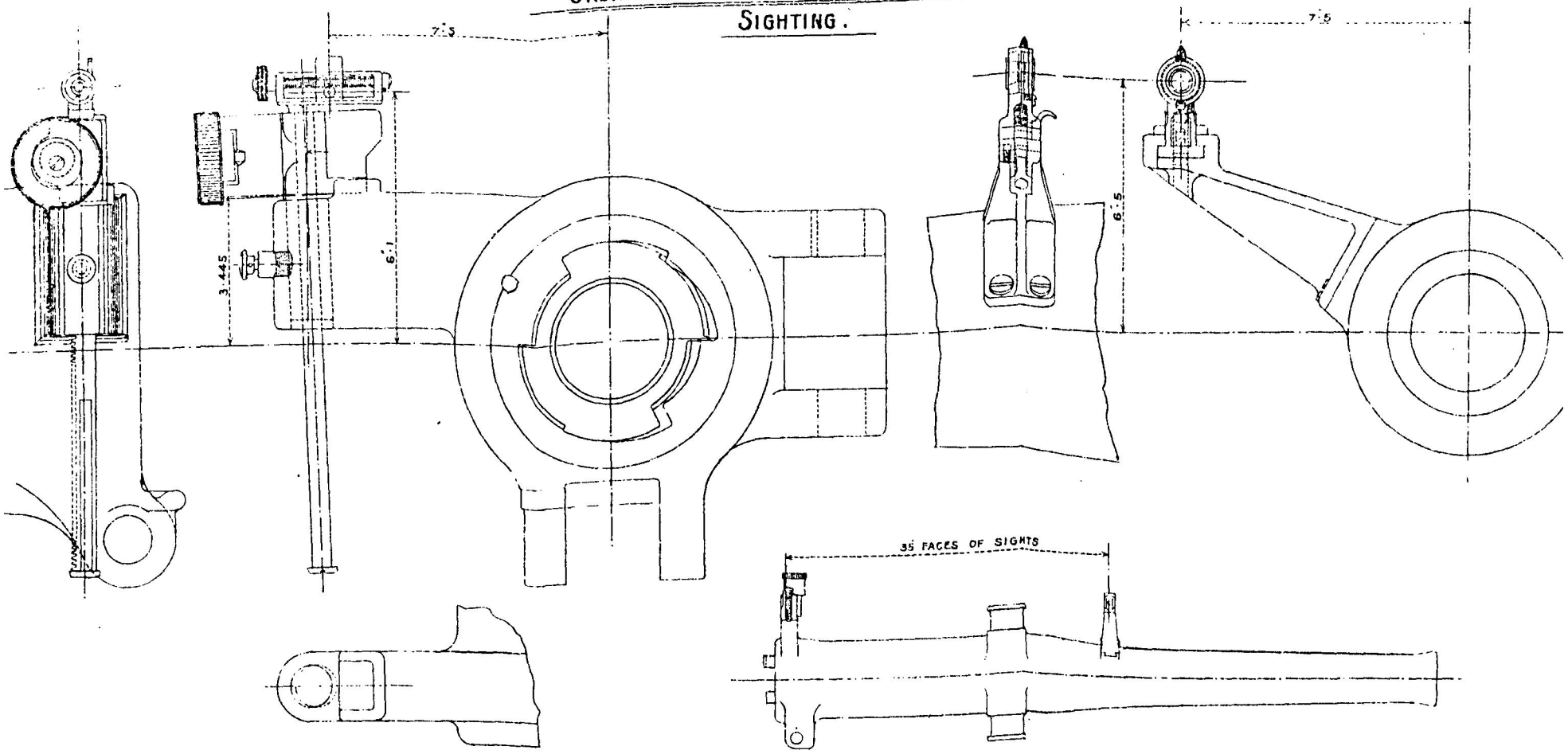
ORDNANCE, B.L., 12-PR 6 CWT. MARK II.

SIGHTING.



ORDNANCE. B.L., 12-PR 6 CWT. MARK III.

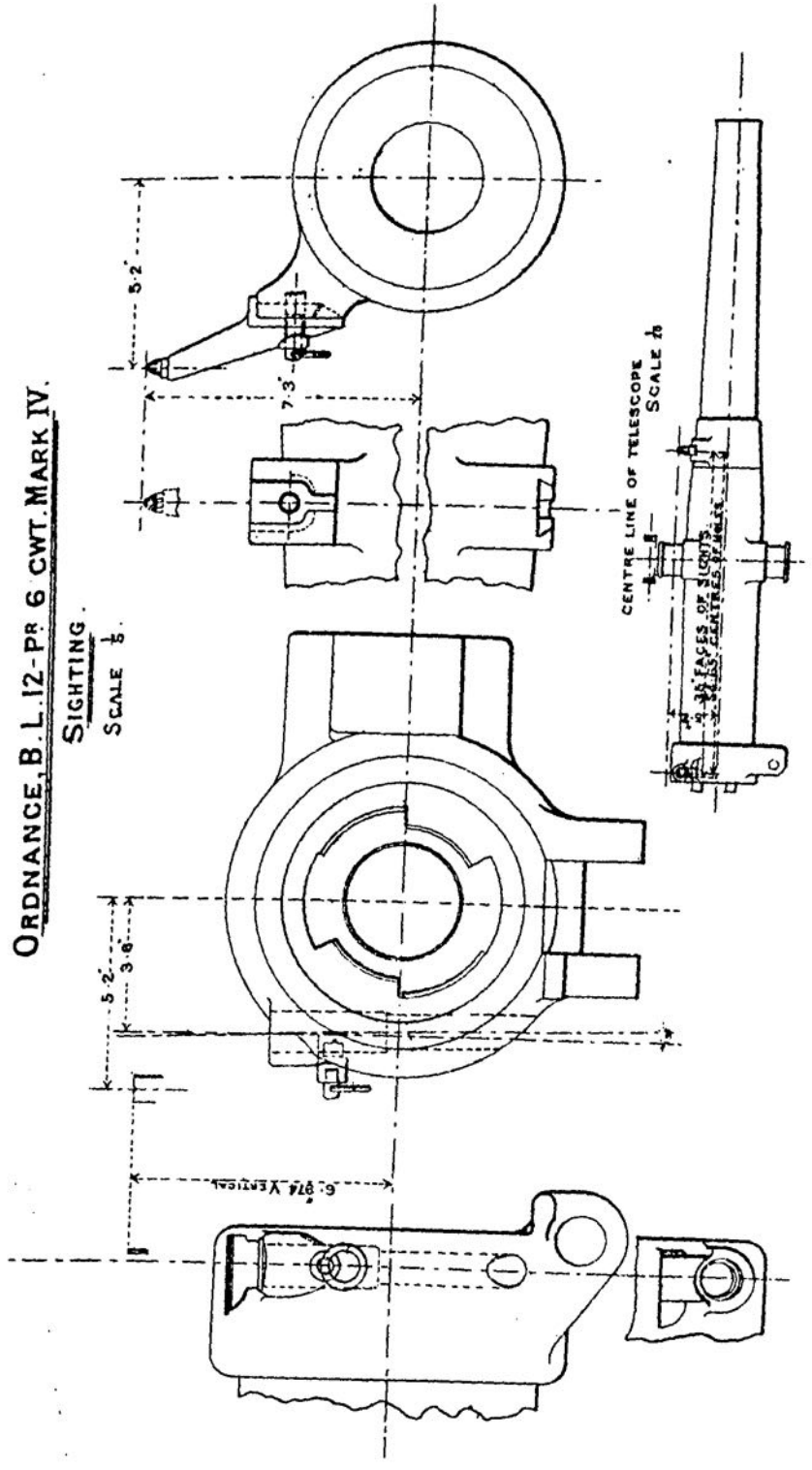
SIGHTING.



ORDNANCE, B.L. 12-PR. 6 CWT. MARK IV.

SIGHTING.

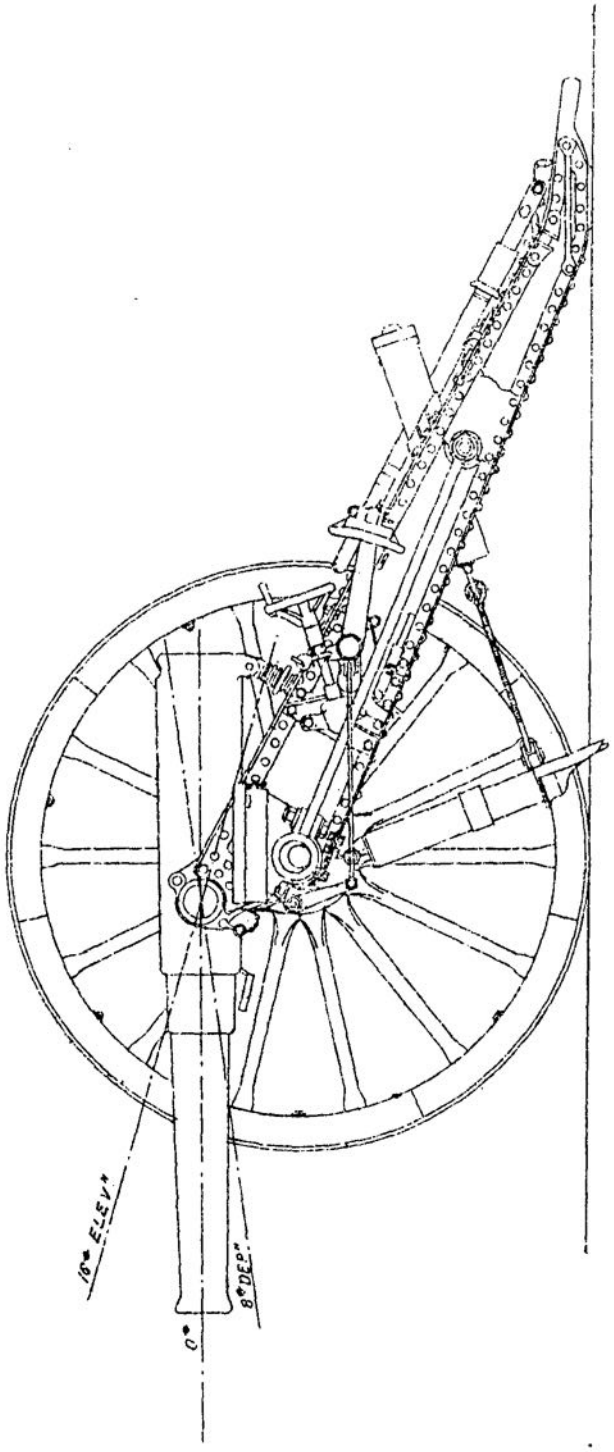
SCALE ½.



3462 . 8 . 1902

CARRIAGE, FIELD, B.L., 12 PR. 6 CWT. MARK I*

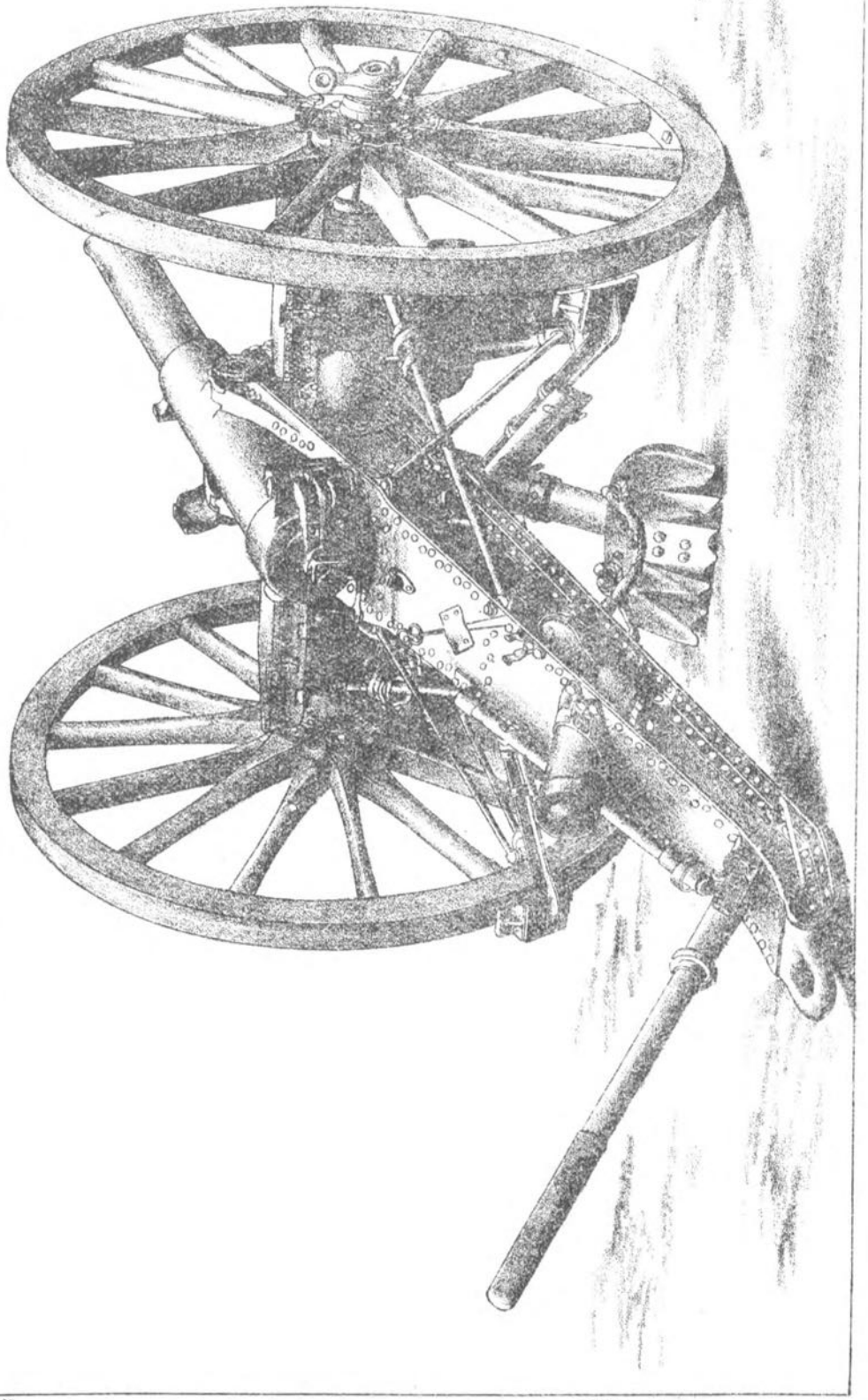
SCALE 1/20.



3452.9.1902

E. Weller & Grahams, Ltd Litho. London.

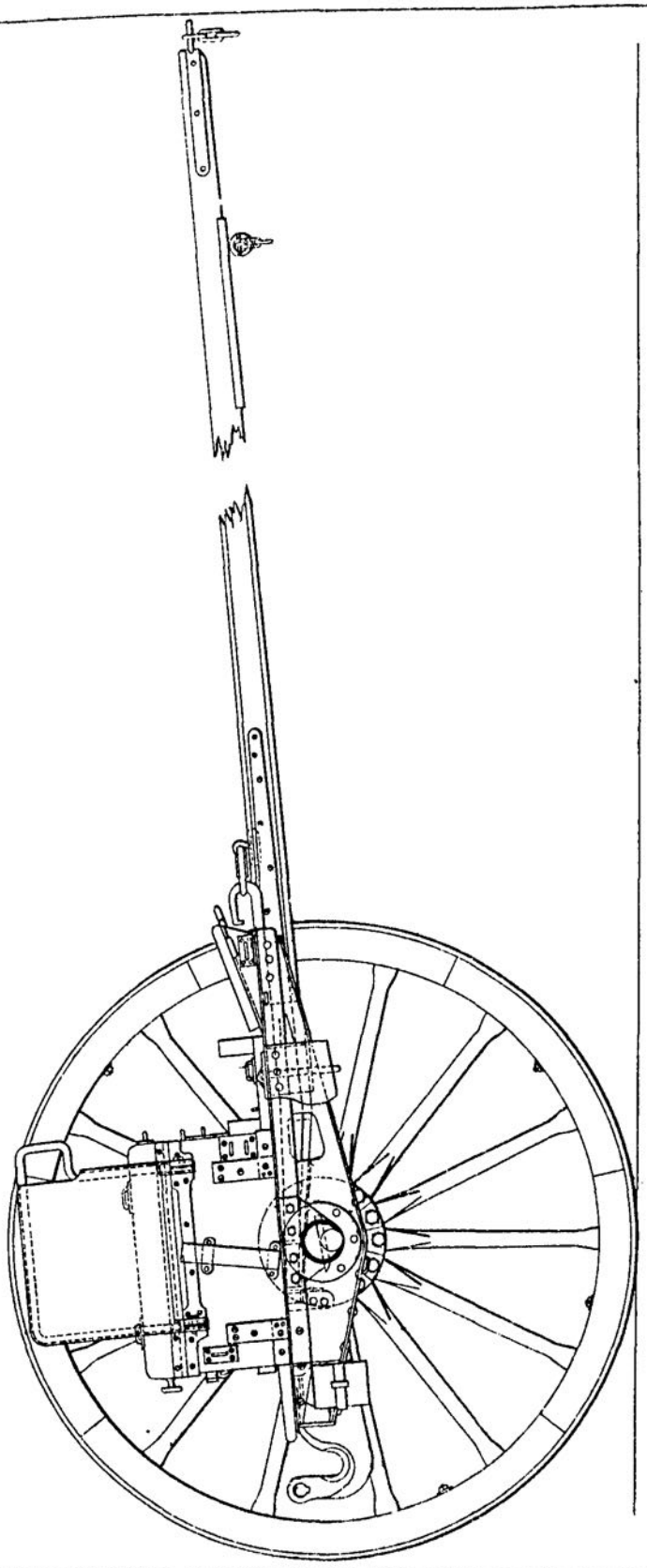
CARRIAGE, FIELD, B.L. 12 PR. 6 CWT., MARK II.



3452. 9. 1902

E. Weller & Grahams, Ltd Litho. London.

LIMBER, FIELD, B. L, 12 PR., 6 CWT. MARK I.

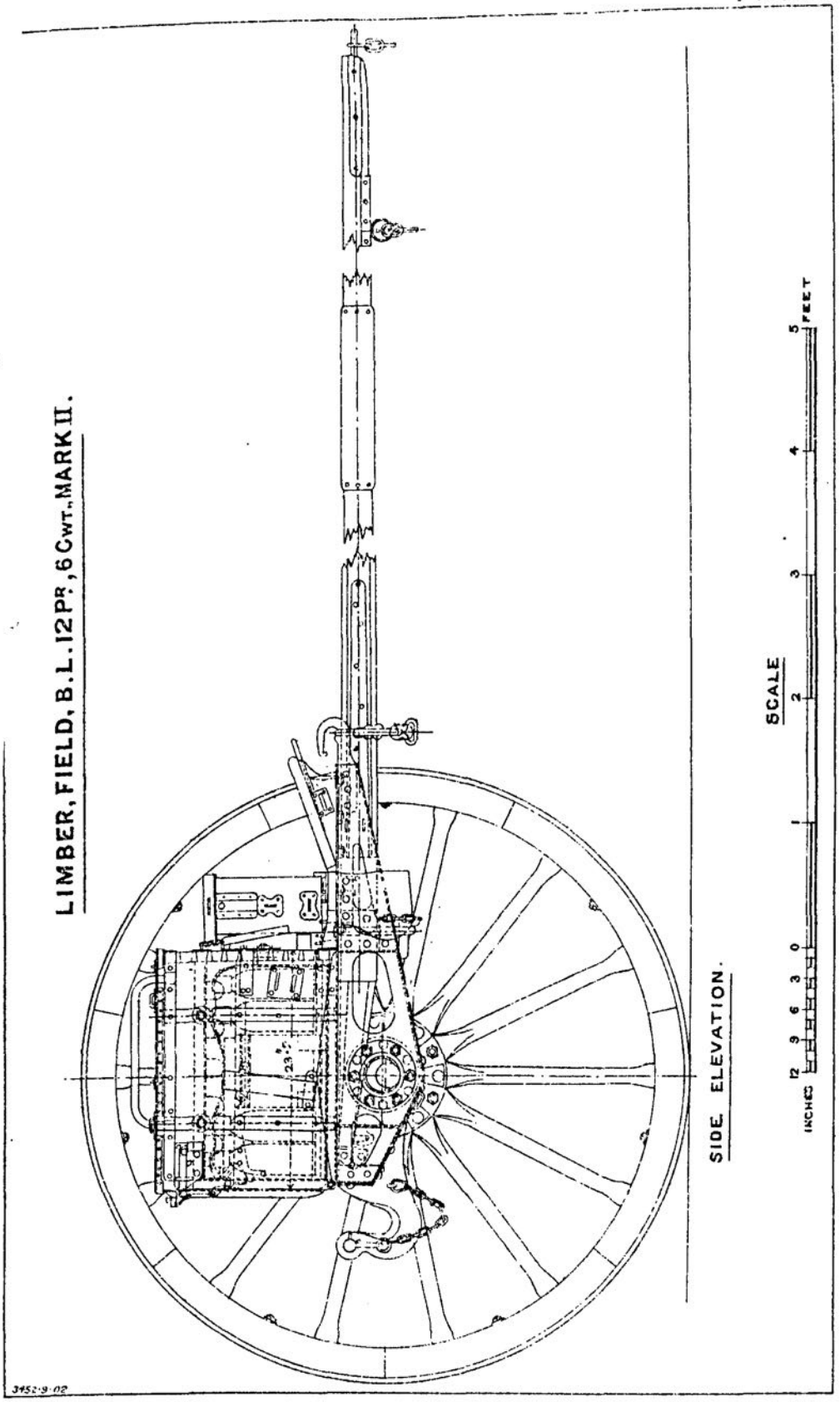


3452.9.02

E.Weller & Grahams, Ltd Litho. London.

Plate XII.

LIMBER, FIELD, B.L. 12 PR., 6 CWT., MARK II.



SIDE ELEVATION.

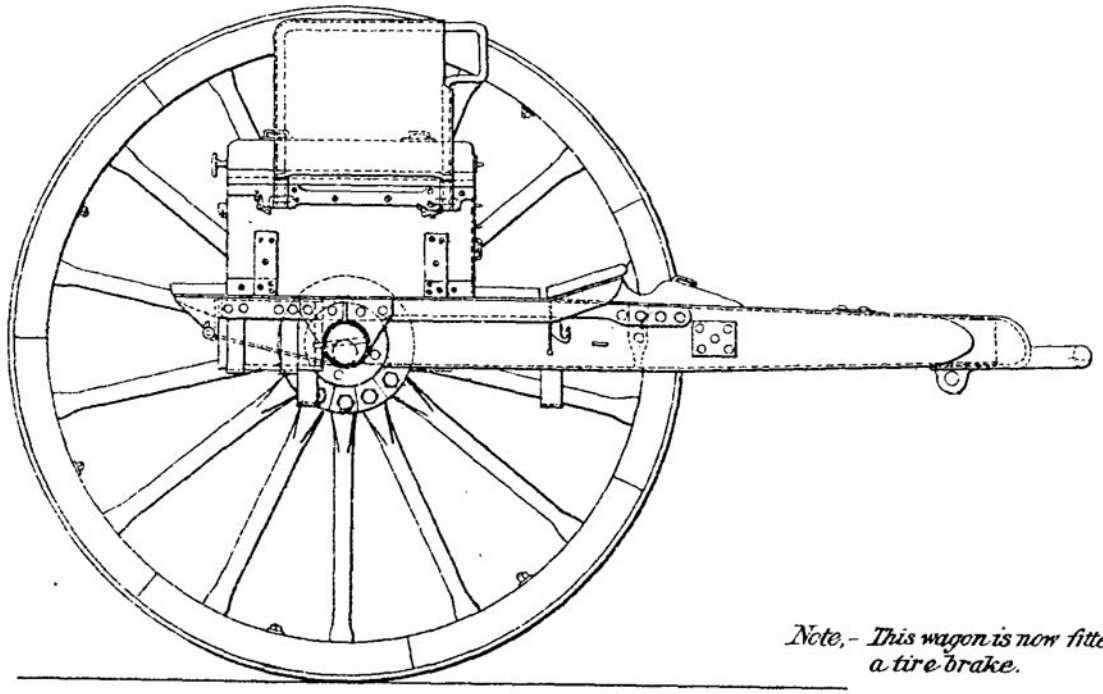
SCALE

INCHES 12 9 6 3 0 1 2 3 4 5 FEET

3452-9-02

E. Weller & Grahams, Ltd Litho. London.

WAGON, AMMUNITION, B.L., 12 PR., 6 CWT. MARK I.

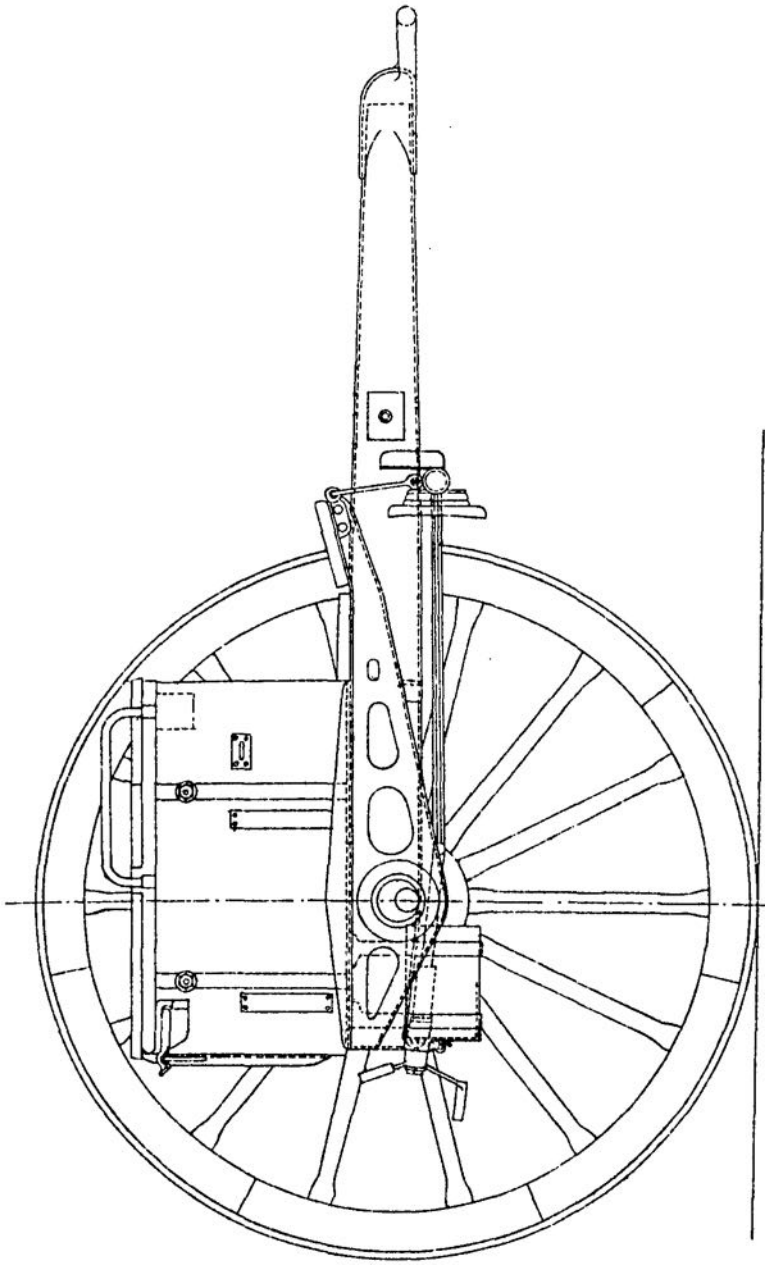


Note,- This wagon is now fitted with a tire brake.

Plate XIII.

E. Weller & Grahams, Ltd Litho. London.

WAGON, AMMUNITION, B.L. 12 PR, 6 CWT. MARK II.



SIDE ELEVATION.

SCALE.

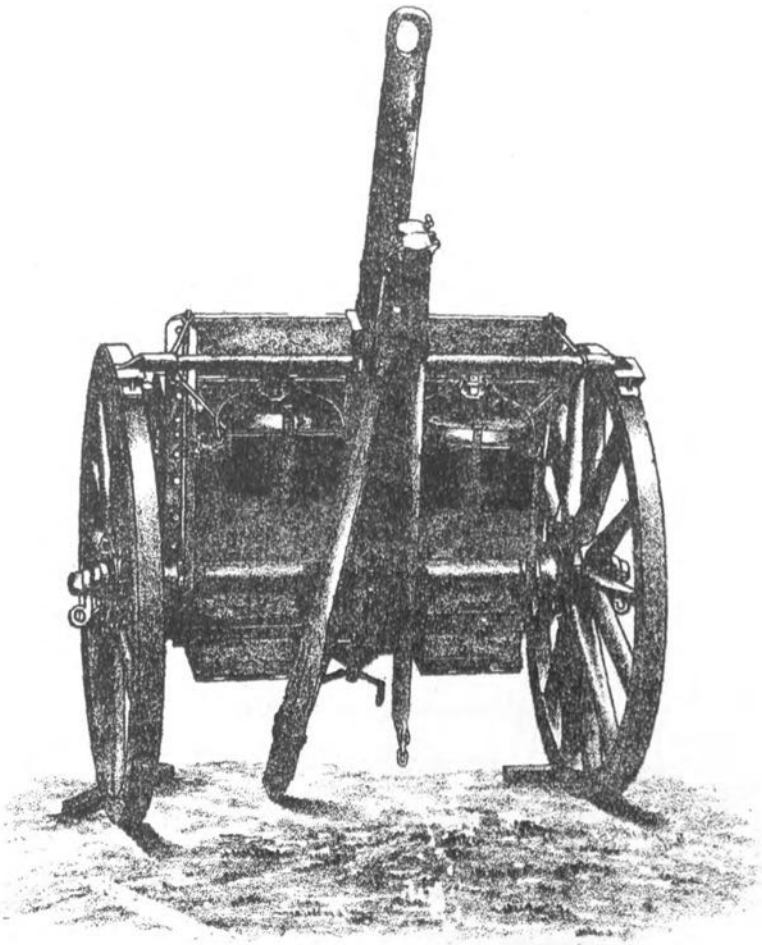
12 9 6 3 0 INCHES 1 2 3 4 FEET

3452.S.1992

E. Weller & Grahams, Ltd Litho. London.

WAGON, AMMUNITION, B.L. 12 PR 6 CWT.

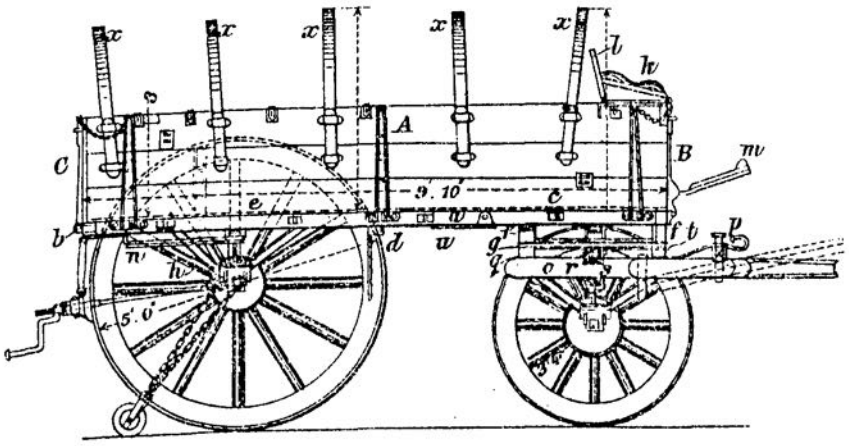
SHOWING POSITION OF SPARE POLE, &C



3452. 9.02

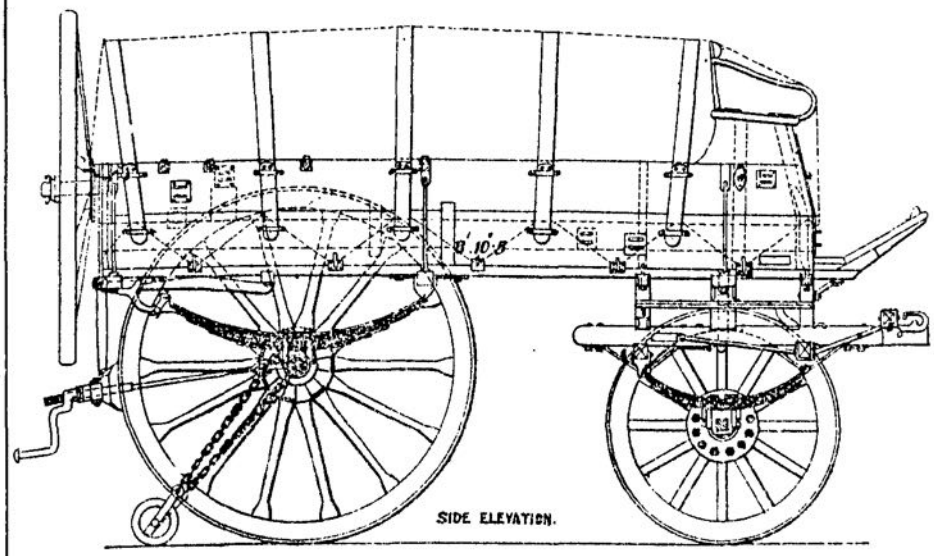
E. Weller & Grahams, Ltd Litho. London.

WAGON, AMMUNITION & STORE, R. A., MARK II*.



WAGON, AMMUNITION & STORE, R. A., MARK IV.

SCALE 1/32.



SIDE ELEVATION.

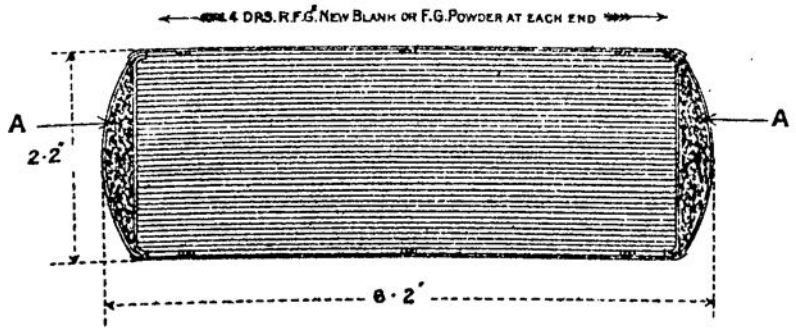
E. Weller & Graham, Ltd Litho London.

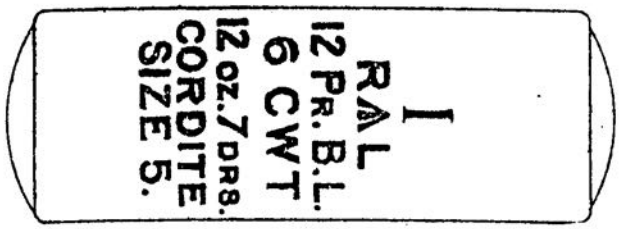
CARTRIDGE, B. L., 12 PR 6CWT.

12OZS. 7DRS., CORDITE, SIZE 5., MARK I.

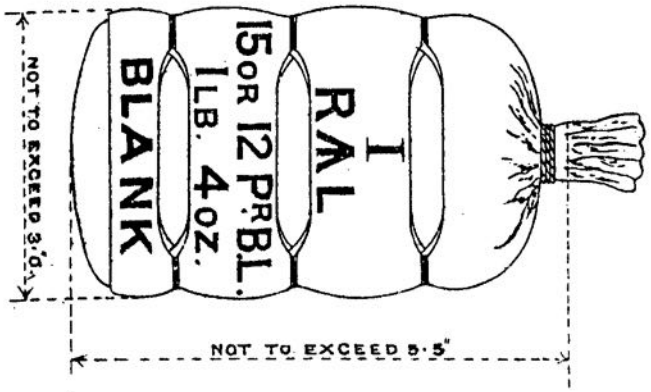
— SHALLOON. —

— Scale ½. —





A. 1 DRAM GUNCOTTON YARN IN MARK II. CARTRIDGE.

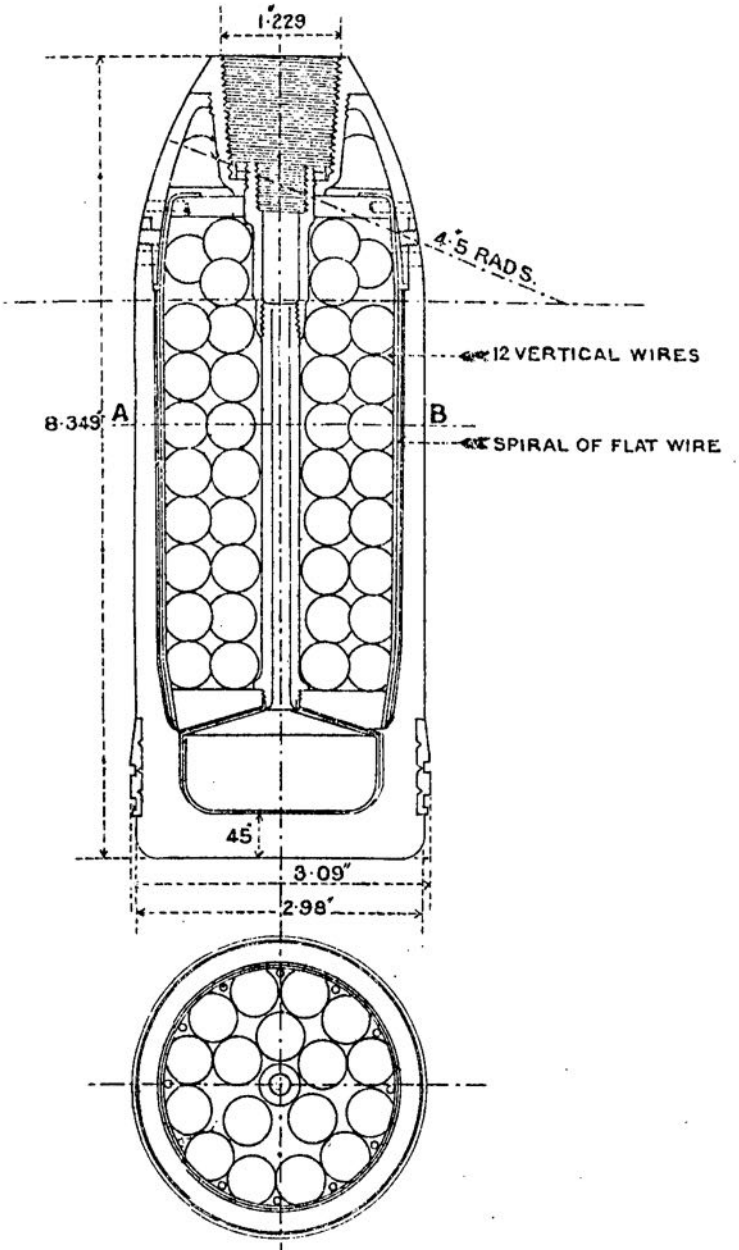


3452. 8. 02

Weller & Grahams. Ltd Litho. London.

SHELL, B.L. OR Q.F. SHRAPNEL, 12 PR, 12, 8 & 6 CWT. MARK II.

SCALE $\frac{1}{2}$



SECTION AT A. B.

J452. 9. 1902

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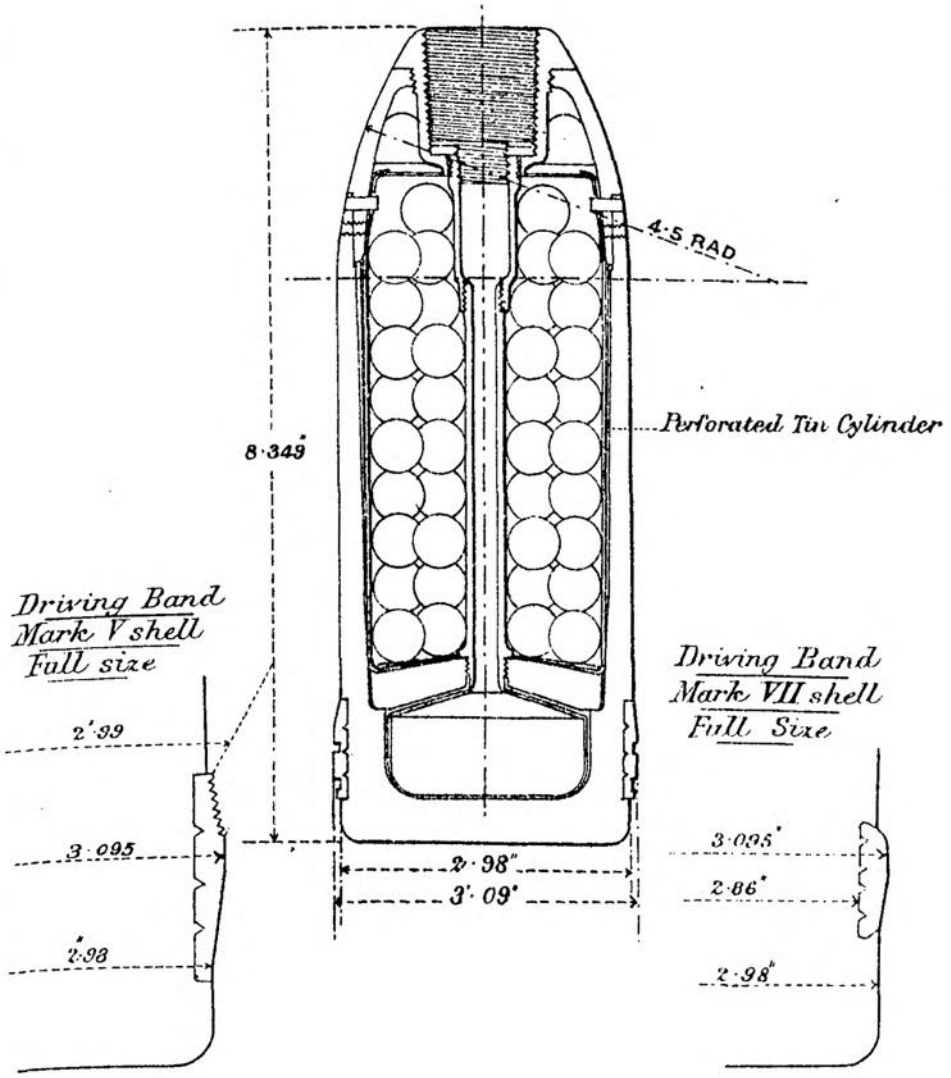
SHELL, B.L. OR Q.F. SHRAPNEL 12 PR 12, 8 AND 6 CWT. MARKS III to VII

FORGED STEEL

SCALE ½



Driving Band Mark V shell Full size

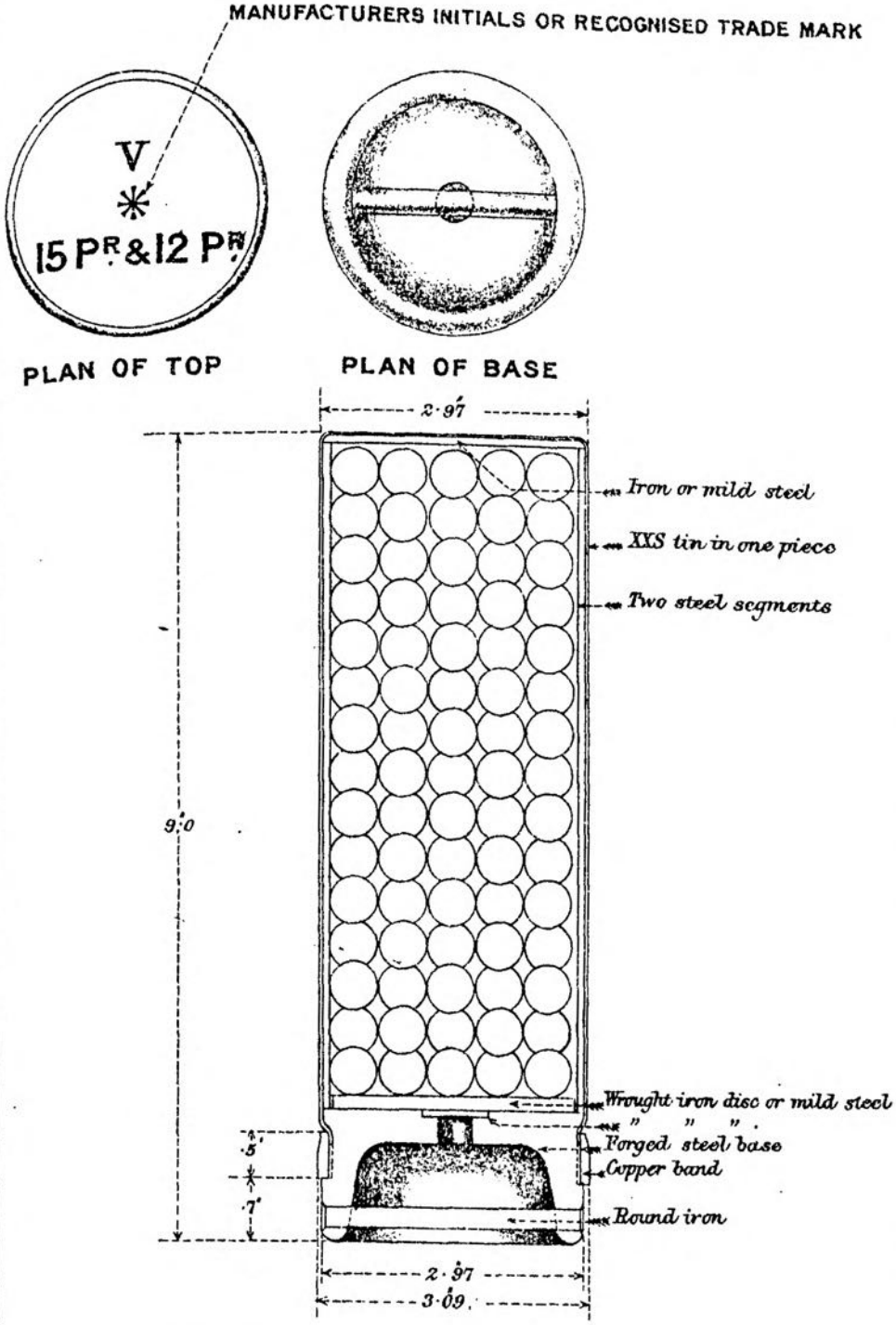
Driving Band Mark VII shell Full Size

3452.9.1902

E. Weller & Grahams, Ltd Litho. London.

SHOT, B.L. OR Q.F. CASE, 15 PR AND 12 PR. MARK V.

SCALE ½

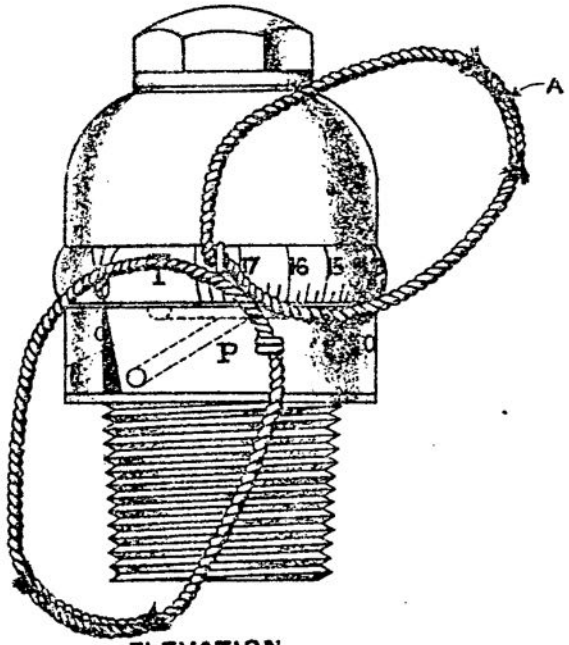


3952·9·02

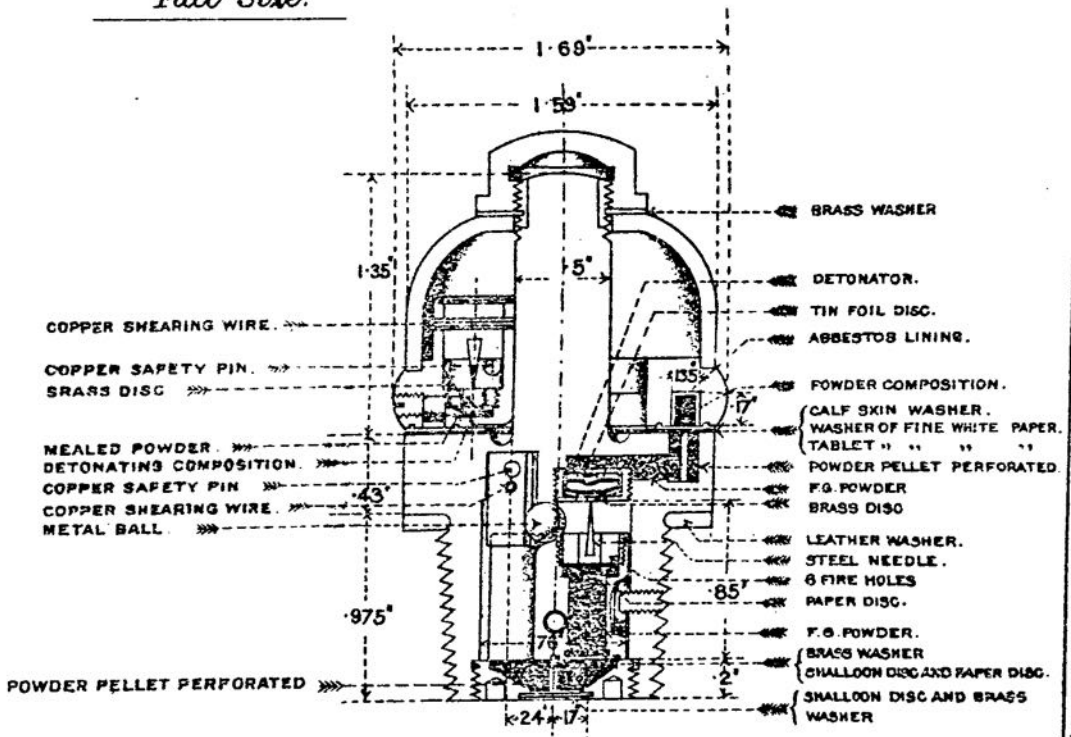
E. Weller & Grahams Ltd Litho London.

FUZE, TIME AND PERCUSSION, Nº 56, MARK IV.

Full Size.



ELEVATION.



SECTION.

A. SCARLET LOOP IN FUTURE MANUFACTURE.

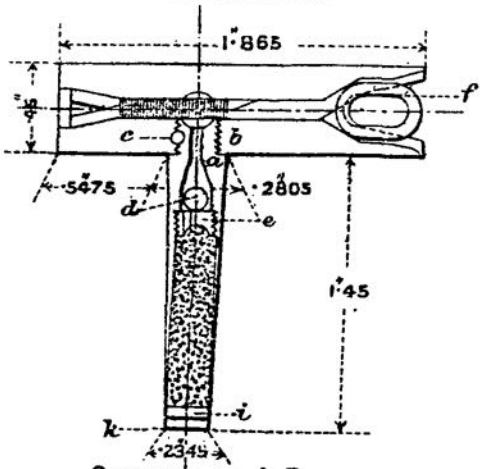
Plate XV.

E. Weller & Graham's Lm. Litho. London.

3452.-9.-02.

TUBE, FRICTION T, MARK II.

— FULL SIZE. —

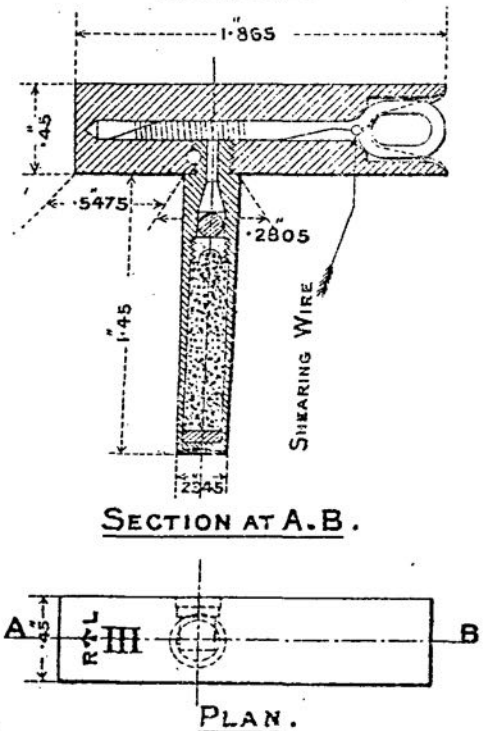


SECTION AT A.B.

PLAN.

TUBE, FRICTION T, MARK III.

— *Full size* —



SECTION AT A.B.

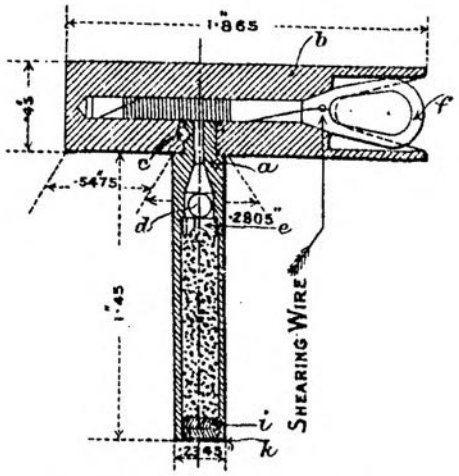
PLAN.

E. Weller & Grahams, Ltd. Litho. London.

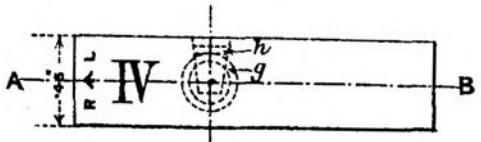
Plate XXII.

TUBE, FRICTION, T, MARK IV.

— FULL SIZE. —



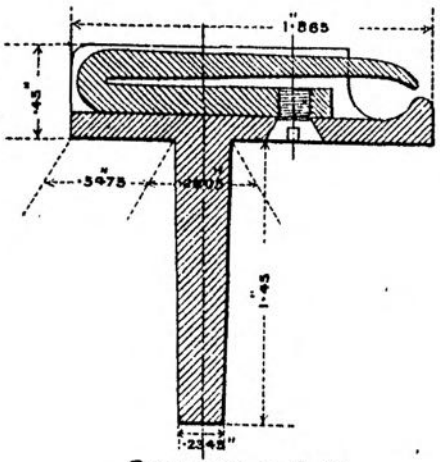
SECTION AT A.B.



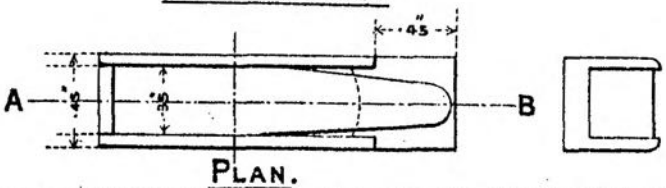
PLAN.

TUBE, FRICTION, T, DRILL, MARK I.

— FULL SIZE. —



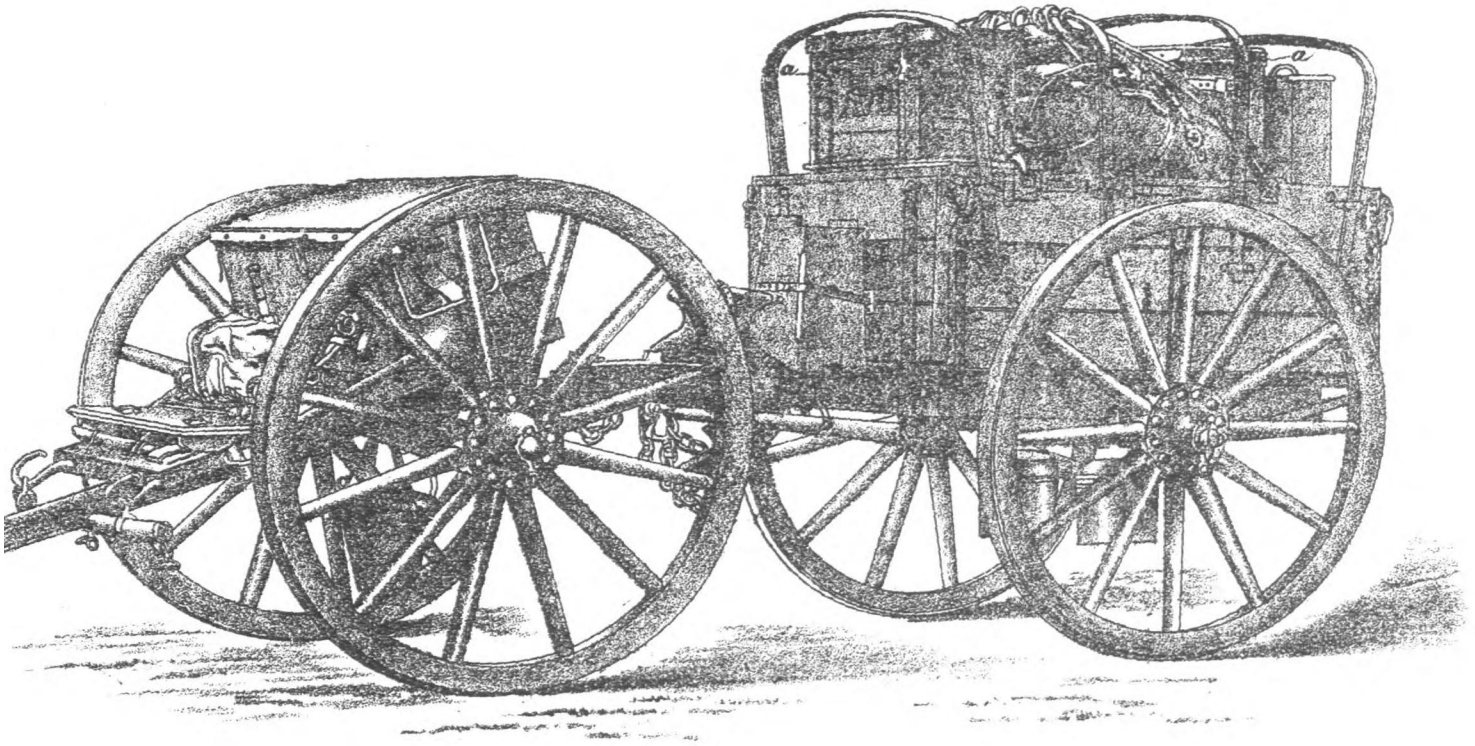
SECTION AT A.B.



PLAN.

3432 9.02

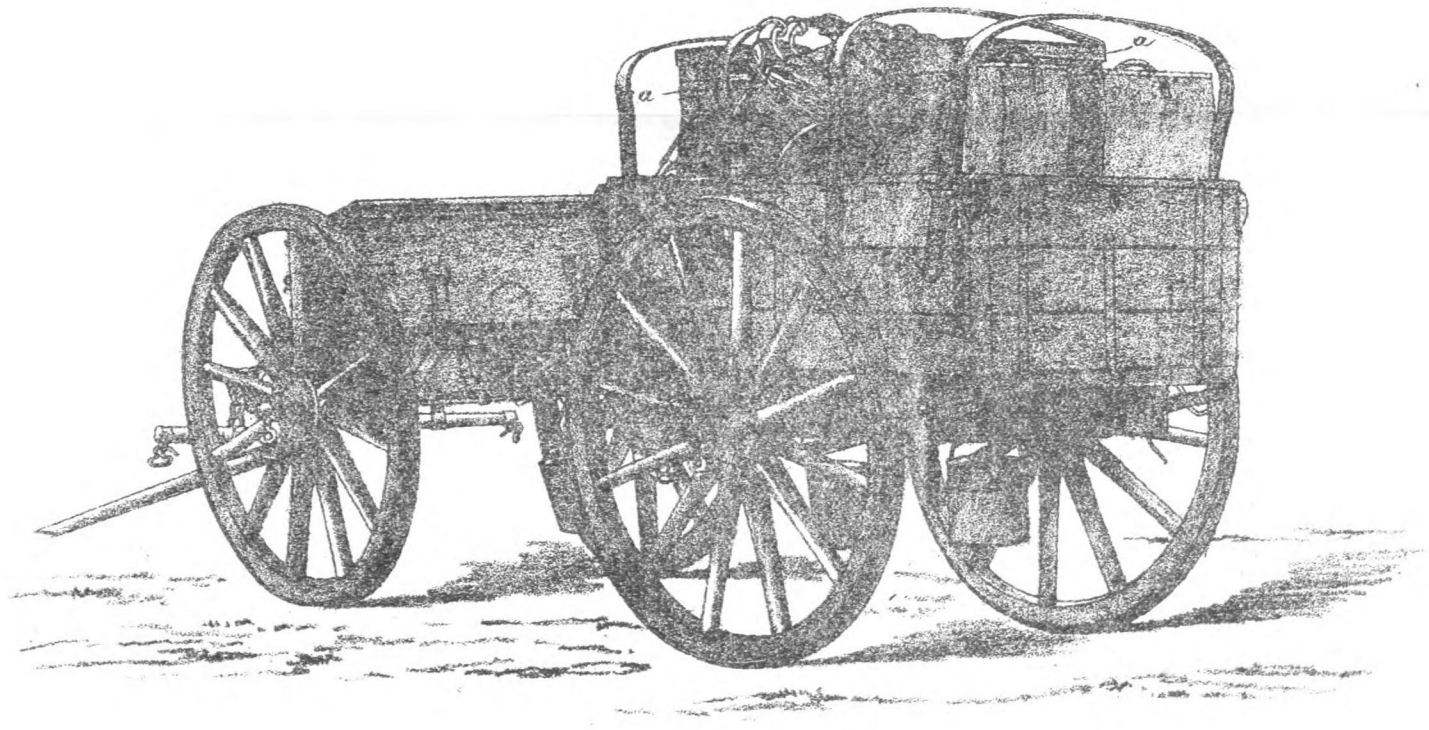
E.Weller & Graham's, Ltd Litho. London.

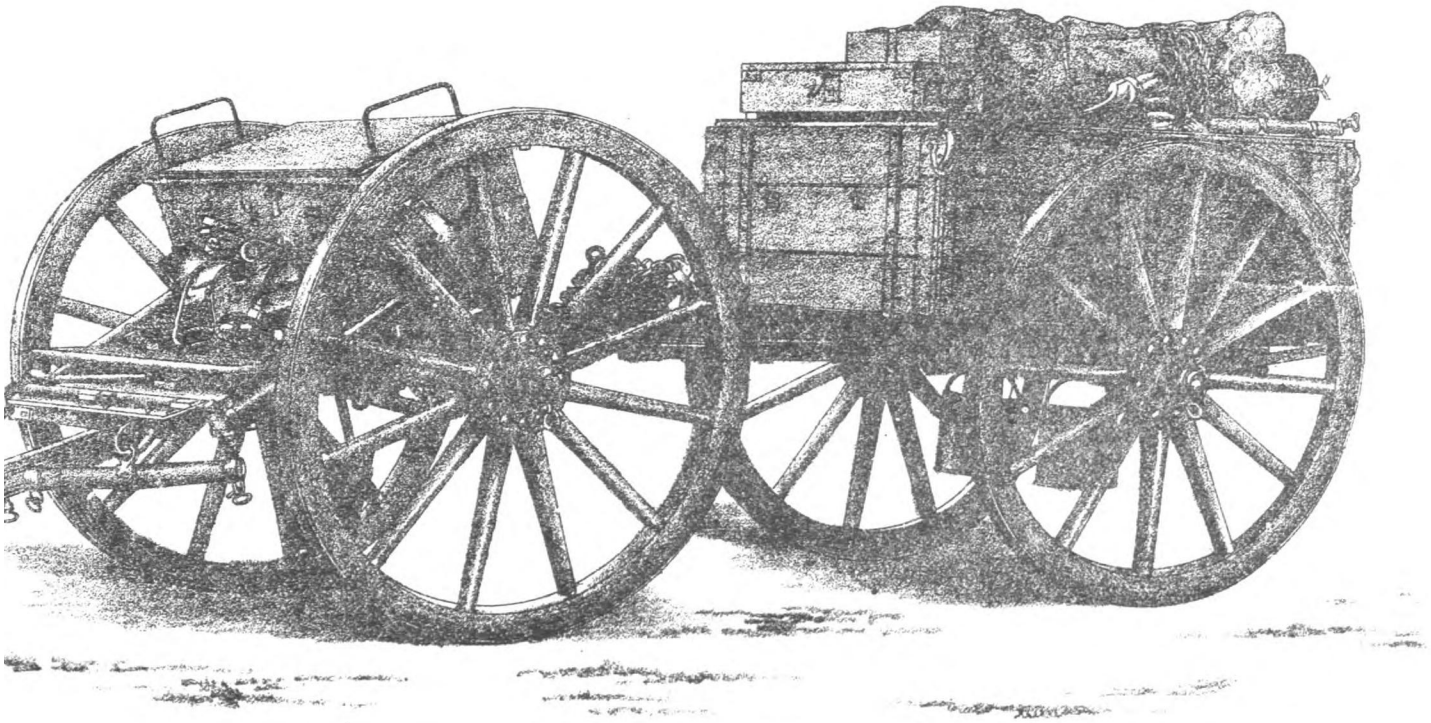


Weller & Grahams Ltd Litho London.

FRONT VIEW.

WAGON, FORGE, (MARK I.* OR II) AND LIMBER

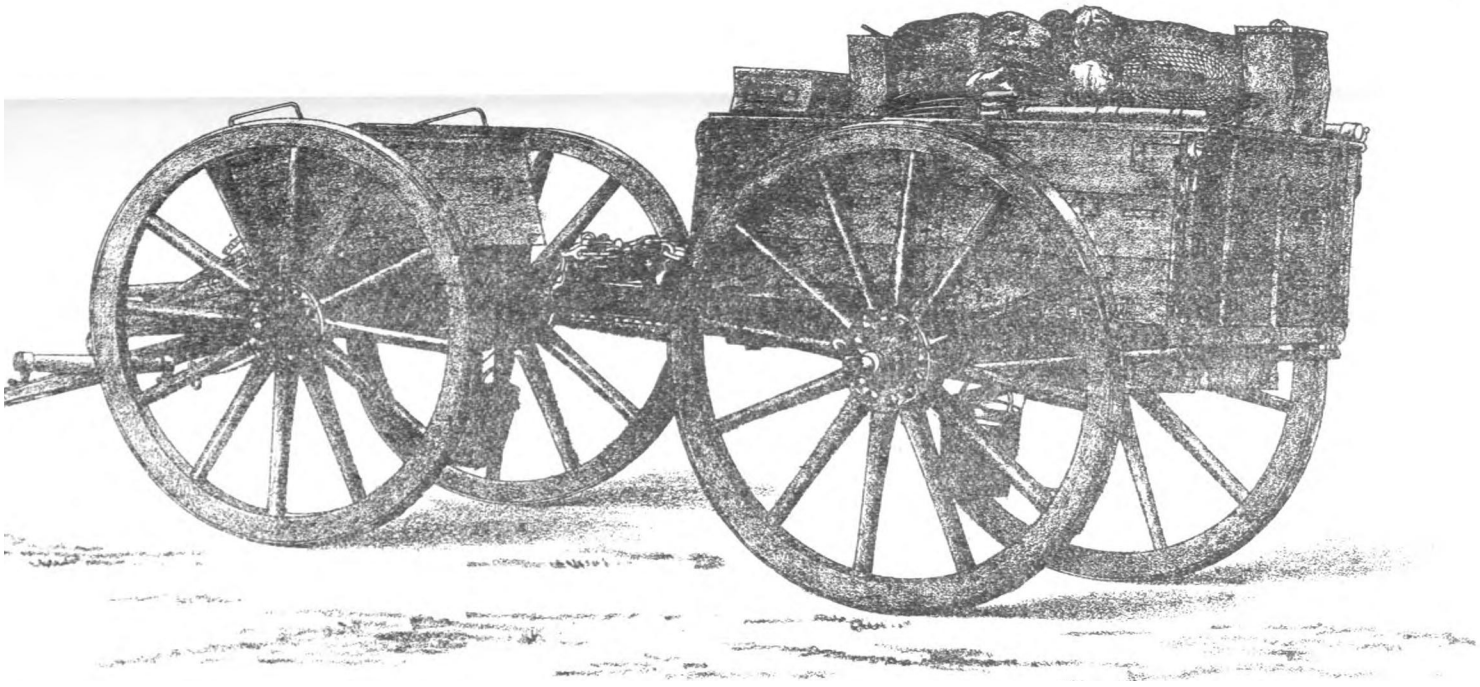


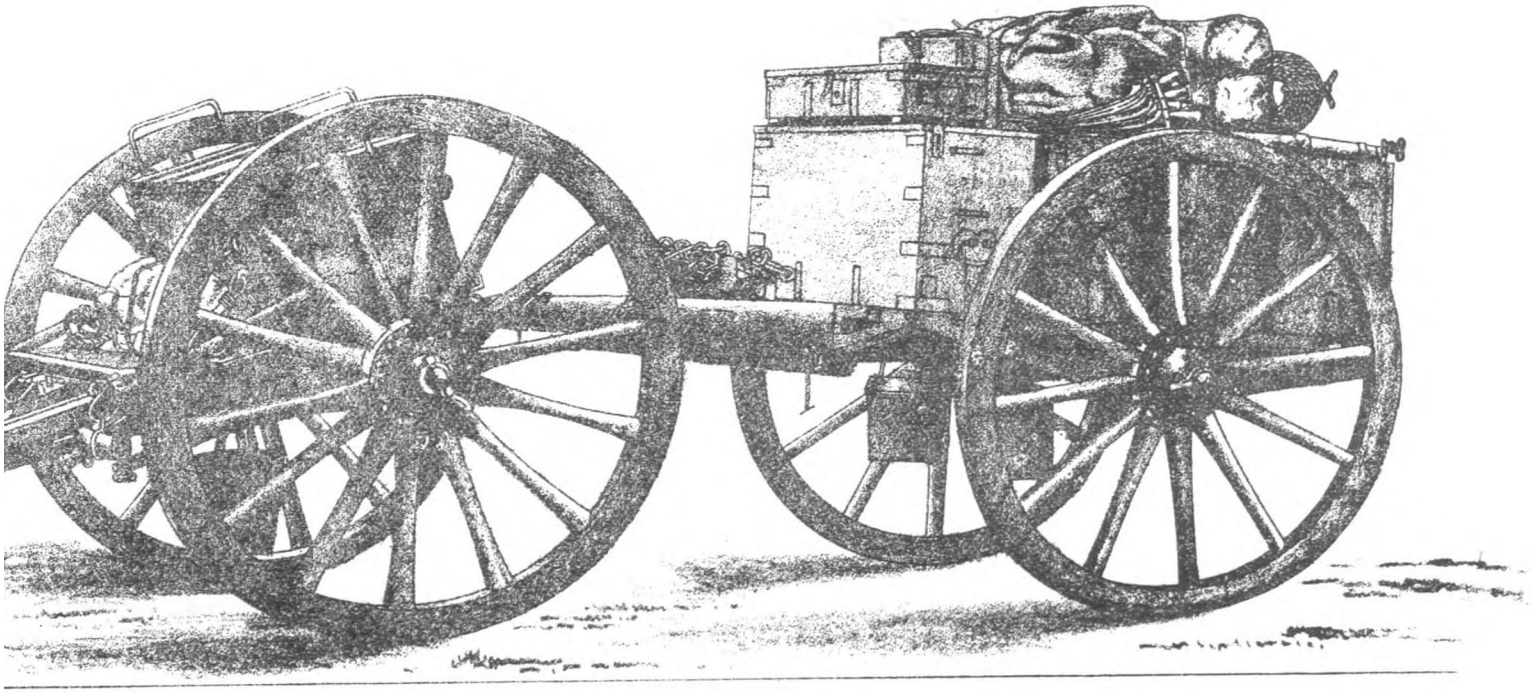


E. Weller & Grahams Ltd Litho. London.

FRONT VIEW.

WAGON, STORE, R.A. (MARK I.) AND LIMBER.





Grahams Ltd Litho. London

FRONT VIEW.

WAGON, STORE, R.A. (MARK II) AND LIMBER.